AFIT/GLM/LAR/94S-1
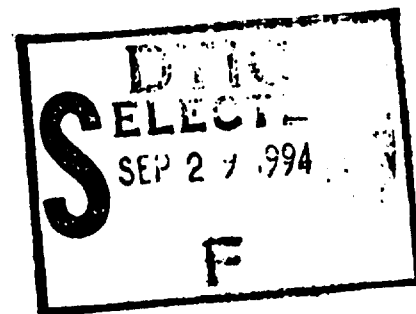
AD A285006

QUALITY IMPROVEMENT ANALYSIS OF THE AIR FORCE
AIRCRAFT MAINTENANCE AND MUNITIONS
OFFICERS COURSE

THESIS

Jeffrey T. Acred, B.S.   James R. Witter, B.S.
Captain, USAF   Captain, USAF

AFIT/GLM/LAR/94S-1

DTIC QUALITY INSPECTED 3

94-31106

94 9 28 155

The views expressed in this thesis are those of the authors
and do not reflect the official policy or position of the
Department of Defense or the U.S. Government.

AFIT/GLM/LAR/94S-1

QUALITY IMPROVEMENT ANALYSIS OF THE AIR FORCE AIRCRAFT MAINTENANCE AND MUNITIONS OFFICERS COURSE

THESIS

Presented to the Faculty of the Graduate School of Logistics
and Acquisition Management of the Air Force Institute of Technology
Air University
In Partial Fulfillment of the
Requirements for the Degree of
Master of Science in Logistics Management

Jeffrey T. Acred, B.S.   James R. Witter, B.S.

Captain, USAF   Captain, USAF

September 1994

Acknowledgments

Table of Contents

List of Figures

List of Tables

AFIT/GLM/LAR/94S-1

Abstract

Previous research concerning aircraft maintenance officer training focused on the content of the training curriculum of the Aircraft Maintenance and Munitions Officers Course (AMMOC). Conversely, this study sought improvement in aircraft maintenance officer training by evaluating the guidance and support provided to AMMOC. Two methods were employed for identifying such opportunities. First, a descriptive model of the training system supporting AMMOC was developed and analyzed. Second, feedback was solicited from AMMOC instructors through the use of a two-round Delphi. The Delphi was employed to develop a consensus among the instructors regarding what improvement opportunities existed and potential means for taking advantage of these opportunities. Findings indicate that AMMOC may be improved by: facilitating better communication between AMMOC, its customers, and other organizations; empowering AMMOC instructors with more control over the course training standard (CTS), student scheduling, and customer feedback; and providing instructors more time for course development by assessing and satisfying AMMOC's manpower requirements and refining training development and manning policies.

QUALITY IMPROVEMENT ANALYSIS OF THE AIR FORCE AIRCRAFT MAINTENANCE AND MUNITIONS OFFICERS COURSE

I. Introduction

Chapter Overview

In recognition of the importance of effective and efficient training, this thesis presents a quality improvement analysis of training guidance and support for the Aircraft Maintenance and Munitions Officers Course (AMMOC). This chapter justifies the analysis by presenting the general issues surrounding training such as the general status of today's Air Force and aircraft maintenance officer training. The chapter then provides the rationale for conducting a quality improvement analysis of AMMOC. The resulting research objective and investigative questions follow. Finally, we provide a summary of the methodology employed with a description of its scope and limitations.

General Issue

According to General Viccellio, Commander and Chief of Air Education and Training Command (AETC), "the decade of the nineties has brought about significant changes in the way we, the Air Force, accomplish our mission" (1993). Since the mid 1980s, Air Force end strength has plummeted to its lowest level in more than 40 years (Perini, 1992: 39). As a result of smaller budgets, the Air Force has undergone extensive reductions in force, base closures, and deactivation of major weapons systems (Perini, 1992: 39). In the midst of this reduction in available resources, the Air Force has witnessed the demise of the former Soviet Union and the emergence of other national

security threats in the Middle East, Eastern Europe, and Southeast Asia. A smaller Air Force in the presence of this unstable world environment underscores the need for flexible and responsive training systems to achieve the Air Force vision of "Global Reach - Global Power."

Aircraft Maintenance Officer Training. The Air Force designated 1992 as the "Year of Training." During this "Year of Training," Air Training Command (ATC) conducted a "top-to-bottom" review of how the Air Force trains its people. Several issues prompted this intensive review of Air Force training. They included the reality of a smaller Air Force, the importance of training in maintaining a combat capability, and the Air Force leaderships' strong emphasis on creating a Quality Air Force (QAF) (Boles, 1994). According to General Viccellio, the questions asked during ATC's review were: "How do we conduct training? Do we do it smartly? Who does it? What's the content? Do we do it effectively and efficiently? Do we do it in standardized way?" (Graham, 1993: 38).

ATC's review of training was broad in scope; it encompassed flying training, technical training, and education (Viccellio, 1993). However, it is unclear whether this review specifically scrutinized the policies and practices pertaining to training of Aircraft Maintenance Officers (AMOs). According to General Viccellio, logistics officer training has virtually gone unchanged during the past twenty years and deserves a "hard look" (1993). Because of AETC's recent emphasis on quality and its apparent willingness to change, we believe this is an ideal opportunity to examine the training of an important component of logistics officer training--the Aircraft Maintenance and Munitions Officers Course (AMMOC).

The Need for Scrutiny. There have been several studies addressing AMO training over the years. The most recent study addressing AMO training is a 1991 Training Evaluation of AMMOC. This evaluation focused on how well AMMOC

1-2

prepared its graduates for future jobs. The study reported that 22 percent of "recent graduates" rated AMMOC as either marginal or unsatisfactory in preparing maintenance officers for their jobs (Department of the Air Force, 1991a: 2). Despite this high number of marginal and unsatisfactory ratings, the training evaluation report concluded that AMMOC was "providing the field with qualified, performance-ready graduates..." (Department of the Air Force, 1991a: 4).

Other than the 1991 Training Evaluation Report, the most recent studies were conducted by Bair and Gatewood (1982), and Frisbee (1988). Both of these studies primarily focused on an age-old debate over the "technical versus managerial" orientations of aircraft maintenance officers. As part of their research, both studies include a significant discussion on AMMOC. Bair and Gatewood assert that "while AMMOC graduates considered their preparation satisfactory, they feel it is too theoretical and quickly loses relevance" (1982: 77). Though Frisbee does not explicitly investigate the appropriateness of AMMOC's curriculum, he does suggest that the training AMMOC provided may have been inadequate (1988: 2). Although evidence suggests that problems with AMMOC curriculum might exist, it is unclear what the causes of such problems might be.

A New Approach. While prior studies have expressed some dissatisfaction with AMMOC, none has addressed AMMOC in any other context than maintenance managers' satisfaction with it. If a significant dissatisfaction with AMMOC has existed over the past 15 years as suggested by prior studies, a deeper focus than curriculum content is in order. Scrutiny must not be limited to AMMOC's product, but must consider the policies, processes, and people who comprise the "system" of training and development. Improvements in the policies and processes associated with training development and operations may hold the key to an improved product and higher customer satisfaction.

An evaluation of organizational policies and processes requires a broader perspective than what was achieved through related studies of AMO training. The quantitative methodologies of previous studies completely ignored the processes and conceptual aspects of the organizations which develop and operate training systems. Bryman (1989) points out that quantitative methodologies tend to evaluate organizations from the perspective of "abstract variables" preconceived by the researchers. Conversely, qualitative methodologies allow researchers to evaluate circumstances in the context of the organizations in which they exist, from the perspective of members of the organization through the use of methods such as document reviews, unstructured interviews, and other techniques that directly involve the stakeholders of the system. Qualitative research can provide a perspective that many quantitative methodologies cannot (Bryman, 1989: 139-141). Such methodologies that focus on organizational processes and individuals are also consistent with Air Force leadership's recent emphasis on the management philosophies of Quality Air Force.

Quality Air Force. Quality Air Force (QAF) is a management philosophy which seeks continuous improvements in the way the Air Force accomplishes its mission. Unlike traditional management concepts, QAF disavows centralized control of day to day operations and processes that take place at the working level. Rather, QAF encourages empowerment of individuals at "the point of contact," and a "customer focus" (Department of the Air Force, 1993f: I-9, II-6).

The QAF concept of "customer focus" recognizes that customers' needs are the organization's sole reason for existence. Even though all organizational activities do not interact directly with the customer, ultimately each activity should contribute somehow to the organization's service or product. Karl Albrecht, author of *Service within,* places every organizational activity in perspective with his assertion that "if you're not serving the customer, your job is to serve someone who is" (1990: 3).

1-4

While AMMOC's external customers are the ones who should ultimately be satisfied, a focus on AMMOC as an internal customer of the training system is of vital importance. According to Osborne and Gaebler, "customers are the most important people for an organization...and management is there to serve those who serve customers" (1992: 172). Within this framework, AMMOC instructors are the providers of service (AMO training), and the training system under which AMMOC operates embodies the management who serves the AMMOC instructors with guidance and support. We define guidance and support as policy, resources, services, or anything else that affects AMMOC's ability to accomplish its mission. The QAF concept of "customer focus" insists that AMMOC, as customers, play an important role in defining the service its management provides.

Another closely related QAF concept is "empowerment at the point of contact." Empowerment means that individuals who are tasked with accomplishing the mission, or "serving a customer," are provided the resources and authority to actually succeed. Worker involvement in improving internal processes is regarded as an important aspect of empowerment. In her quality article series, Keane quotes General McPeak, Air Force Chief of Staff, as saying, "It's often the person who's right in contact with the work who understands what needs to be fixed about that process" (1992: 7). Recognizing that "empowerment at the point of contact" is a basic principle of QAF, and that AMMOC is the "point of contact" in the training of AMOs, it must be true that AMMOC instructors are individuals the Air Force wants to empower.

Research Objective

Within the framework of the Quality Air Force, the objective of this thesis research is to identify opportunities to improve the support and guidance provided to the Aircraft

Maintenance and Munitions Officers Course (AMMOC). To that end, this research addresses the following investigative questions:

1. What areas related to the guidance and support provided to AMMOC are the strongest candidates for improvement initiatives?

2. How can the identified areas be improved?

Conduct of Study

This research seeks to achieve the research objective above through a combination of two means. The first is to develop a narrative description or model of the training system to which AMMOC belongs. This training system description is derived from reviews of Air Force publications and unstructured discussions with training practitioners. The training system is then evaluated by the researchers to identify potential improvements in organizational structure. The training system description is presented in Chapter II, and discussed in Chapters IV and V.

The second method for achieving our research objective is to obtain the opinions of AMMOC instructors regarding how training guidance and policy may be improved. As "customers" of training policy and guidance, AMMOC instructors are in an excellent position to identify opportunities to improve the training support they are afforded. Many of the AMMOC instructors are not only internal customers of the training system, but are also experienced as external customers of AMMOC, as former AMMOC students, and as former supervisors of AMMOC graduates. Furthermore, because AMMOC employs its former students as instructors, in a sense, AMMOC is its own customer.

The methodology we chose for acquiring the group opinion among AMMOC instructors is known as the Delphi technique. We chose this technique because it facilitates the free expression of ideas among the AMMOC staff without the stigma of any particular instructor attached to them. This Delphi procedure consisted of two rounds of

a question and feedback process. The first round solicited a diversity of ideas from AMMOC instructors through open-ended questions regarding the support and guidance AMMOC is provided and how it may be improved. The second round anonymously presented each AMMOC instructor's ideas to each of the other instructors for a vote to determine if consensus existed among the instructors. Further discussion and analysis of the Delphi is presented in Chapters III and IV, respectively. The conclusions and recommendations of this thesis are based on both of the methodologies discussed above and are presented in Chapter V.

Scope. The scope of this research is limited to identifying opportunities for improving the support and guidance provided to the Aircraft Maintenance and Munitions Officers Course (AMMOC). Sources for identifying opportunities are limited to AMMOC instructors and the researchers. The support and guidance under consideration may originate from any organization, at any level.

Limitations.

1. During the conduct of this research effort, AETC was in the midst of reviewing and redefining technical training policy. While every attempt has been made to incorporate the most recent policy into this research, it is possible that some of the policies relevant to this thesis have changed.

2. The respondents for the Delphi procedure were limited to AMMOC instructors. This is because of the importance of "customer focus" in process improvement, and because AMMOC is a primary customer of the training support it is afforded. We recognize that other credible sources of training expertise were available, but not included in this study.

Summary

This chapter established the focus of this research effort. The unstable world environment and shrinking military budget and force structure have elevated the need for effective and efficient training. The means for obtaining the best training possible can be found in the concepts embodied in the Quality Air Force initiative. The Air Force's aircraft maintenance officer training system must continuously improve its processes, it must assume both an internal and external customer focus, and it must empower at the point of contact. This thesis proposes a research objective and methodology which meet these requirements.

The chapters that follow describe the current training system and relevant processes, the methodology employed to achieve the research objective, the results and findings of the research, and finally, the conclusions and recommendations derived from the findings.

II. Background

Chapter Overview

Before pursuing the research objective of identifying opportunities to improve the guidance and support provided to AMMOC, relevant information concerning AMMOC and its supporting system should be considered. This chapter provides an overview of the AMO career field and training, relevant research, instructional systems development, and a description of the global training system in which AMMOC exists.

The Aircraft Maintenance Officer

AMOs are responsible for managing and leading large organizations tasked with maintaining the readiness of multimillion dollar aircraft and equipment, and supporting flying operations during peacetime and war. Aircraft maintenance is an extremely broad discipline which requires technical expertise, managerial competence, and leadership ability (Department of the Air Force, 1991b: A11 - A16). Duty assignments for AMOs are possible at operational wings, air logistics centers, and major command headquarters throughout the world in support of various weapons systems and missions (Department of the Air Force, 1991c: 92-97). According to AFR 36-1, *Officer classification,* aircraft maintenance and munitions:

> encompasses the functions of program formulation, policy planning, production management, quality control, inspection, and direction of aircraft maintenance, avionics, and munitions activities...[the aircraft maintenance officer] manages all levels of aircraft maintenance, its associated subsystems, and munitions activities...organizes units to accomplish maintenance...allocates available maintenance resources to ensure maximum equipment readiness...assigns work, establishes priorities, and controls or monitors production...Implements aircraft emergency war order and combat turn activities...confers with operations activities to determine operational problems and support requirements...observes work in progress and reviews actions for quality and compliance with technical, safety, and security directives...evaluates effectiveness of systems operation and recommends

changes in operational use, equipment modification, and maintenance procedures...directs nuclear receipt, storage,...maintenance,...safety, and security activities.... (Department of the Air Force, 1991b: A11 - A16)

Training for entry-level AMOs consists of a mix of formal technical training and on-the-job training. Completion of AMMOC and a minimum of six months of experience in an AMO duty position are required for designation as a fully-qualified AMO. Although not required, the Air Force prefers AMOs with undergraduate degrees in engineering, management, or the physical sciences (Department of the Air Force, 1991b: 11-15 - 11-16).

History of the AMO Career Field and Training

Formal training of AMOs seems to have become a sacred institution. The United States Army first established a need for aircraft maintenance capabilities in 1907 when its Aeronautical Division possessed a single aircraft. Army officers learned aircraft maintenance skills on the job until 1917 when formal aircraft maintenance training was established by the Air Corps Technical School at Kelly Field, Texas. In 1921, the course was renamed the Air Service Mechanics School and relocated to Chanute Field, Illinois, where it eventually evolved into the Aircraft Maintenance and Munitions Officers Course (AMMOC) (Chandler and Fox, 1988: 3). In 1993, after nearly 76 years of aircraft maintenance training, AMMOC was relocated to Sheppard AFB, Texas, during the closure of Chanute AFB.

Throughout the years, the AMO career field and its associated training have undergone a cycle of change. This cycle began with divergence of the munitions maintenance and aircraft maintenance activities in 1927 and the subsequent transfer of munitions training from Chanute to Lowry Field at Denver, Colorado, in 1938. Higher degrees of specialization continued, and by 1955, the aircraft and armament career fields had been shredded into sixteen officer specialties. In 1963, justified by the increasing

complexity of aviation and armament technology, the avionics/munitions specialty was created.

This trend of specializing aircraft maintenance disciplines reversed in the 1970s. By 1976, the avionics and aircraft maintenance specialties were recombined, and during the 1980s, after years of debate, the munitions and aircraft maintenance career fields were also reconsolidated (Chandler and Fox, 1988: 7-19). Today, the aircraft, avionics, and munitions maintenance disciplines comprise a single Air Force officer career field (Department of the Air Force, 1991b: A11- 18), and all maintenance officer technical training is conducted by AMMOC at Sheppard AFB, Texas (Lawlor, 1994).

AMMOC

AMMOC is a formal, entry-level, technical training course conducted by the 362nd Training Squadron at Sheppard AFB, Texas. Depending on the background of the students, they will attend at least one of four aircraft maintenance and munitions officers courses. The majority of students are junior officers who are new to the aircraft maintenance officer career field. These students attend the "basic" course which is presently 18 weeks in length. Shorter courses exist for Air National Guard and Air Force Reserve officers with aircraft maintenance experience, and for rated officers who are cross-training into the maintenance career field. A fourth course AMMOC offers is a follow-on to the basic course and focuses on nuclear weapons theory, policy, and procedures (Department of the Air Force, 1993h: 3-64). Throughout this thesis, the term "AMMOC" refers to the basic course described above.

Course Content. AMMOC provides an overview of a wide variety of subjects such as aircraft and munitions systems theories, maintenance management policies, and maintenance management information systems. The course mostly consists of classroom lecture and discussion, but also includes tours of aircraft maintenance activities and a few

hands-on maintenance tasks. Furthermore, Block IX of the course is a simulation of an actual maintenance operation. The proficiencies required for completion of AMMOC are extremely basic. Learning objectives typically call for students to identify facts or principles concerning various subjects. Table 2-1 below illustrates the general flow of the major subject areas throughout the course (Department of the Air Force, 1993a).

Table 2-1. Sequence of AMMOC Training (Department of the Air Force, 1993a)

Block	Description
I (9.5 days)	Orientation, Maintenance Staff Agencies, Production Activities
II (10 days)	Microcomputers, Personnel, Communications Security, Operations Security
III (10 days)	Munitions, Maintenance Storage and Handling, Explosive Safety
IV (10 days)	Aerodynamics, Structures, Nuclear Weapons, Preventative Maintenance, Reliability and Maintainability
V (10 days)	Electricity, Aircraft Power Supply System, Basic Avionics System and Associated Equipment,
VI (10 days)	Jet Engines, Aircraft Systems, Support Equipment
VII (10 days)	Supply, Resource Management, Munitions Accountability
VIII (10 days)	Maintenance Forms, Exceptional Releases and Maintenance Management Information Systems
IX (8 days)	Production Planning and Maintenance Planning

(Note: Only a representative selection of course topics is included in this table)

Course Operation. As depicted in the table above, AMMOC is currently an 18-week course which consists of nine two-week blocks of instruction. Usually, AMMOC receives a new class every two weeks. Students begin and progress through

AMMOC in groups of approximately 15. AMMOC's training day is designed to include eight 50-minute sessions of instruction, a lunch period, and 10 minute breaks throughout the day. Generally, each block of instruction is administered by a single instructor. Once a block of instruction is completed, students progress to the next block and instructors receive new groups of students. The AMMOC instructor staff is comprised of 16 AMOs and civilian instructors with varying levels of aircraft maintenance experience (Dalton, 1994).

It should be noted that during the 1994 AMO Utilization and Training Workshop (U&TW), it was agreed that AMMOC should be streamlined by eliminating some elements of curriculum which are already provided by other sources of training. It was also decided that the course's length should be commensurately reduced from 18 weeks to approximately 13 weeks. The revised curriculum is planned to become effective in July 1995 (Broardt, 1994).

Related Research

A thorough review of literature and informal discussions with the researchers' colleagues reveal only a few prior research efforts that are relevant to this thesis--one informal and three formal. The most relevant forum was an informal quality improvement workshop conducted by AMMOC in 1992. The three formal studies were a 1991 Training Evaluation Report (TER) on AMMOC, and two AFIT theses.

The purpose of AMMOC's 1992 quality improvement workshop was to define AMMOC's "mission" and "vision," and to identify and resolve problems that threatened either of them. The participants in this workshop were AMMOC instructors, including one of the authors, and course development personnel at Chanute AFB, Illinois. The participants defined AMMOC's mission and vision as the following:

Mission: Preparing officers to lead and manage in an aircraft maintenance and munitions environment. (AMMOC, 1992)

Vision:
[1.] Be on the leading edge and recognized as the authority in the aircraft maintenance and munitions management field,
[2.] the 'place to be' for both instructors and students,
[3.] fielding a course which is both challenging and rewarding, making students proud to be an AMMOC graduate. (AMMOC, 1992)

During this workshop, participants, through the use of an experienced facilitator, identified problems affecting AMMOC. On an anonymous basis, the workshop participants ranked the severity and solvability of each problem. The participants based the solvability of each problem on AMMOC's capability and authority to implement corrective actions. The aggregate of solvability and severity rankings established priorities for future management attention. The general problem areas identified were student measurement, course content, course operations, student administration, reference materials, morale, funding, centralized control, equipment, and facilities.

This workshop's emphasis on solvability in establishing priorities for problem areas indicates that the workshop was primarily focused on solving AMMOC's internal problems. Conversely, this thesis is primarily intended to address issues beyond AMMOC's control. Problems addressed by this workshop which the researchers found through subsequent research to potentially be beyond AMMOC's control were the basis of the first round Delphi questionnaire described in Chapter III and presented in Appendix E.

The most recent evaluation of AMMOC was conducted by the 3330th Technical Training Wing at Chanute AFB, Illinois, in 1991. The purpose of the evaluation was to determine if AMMOC graduates were using their training, and how well the training prepared the graduates for duty. The evaluation was based on internal performance measures, inspection results, interviews of two AMMOC graduates, and questionnaires administered to 106 AMMOC graduates. As shown in Table 2-2, 78 percent of the

graduates rated AMMOC as satisfactory or higher in preparing AMOs for duty; 22

percent of the graduates rated AMMOC otherwise (Department of the Air Force,

1991a: 2).

Table 2-2. AMMOC Graduate Ratings of AMMOC Performance
(Department of the Air Force, 1991a: 2)

Ratings	Number	Percentage
Outstanding	4	4
Excellent	19	20
Satisfactory	51	54
Marginal	20	20
Unsatisfactory	2	2
Total	96	100

This Training Evaluation Report was the first evaluation of AMMOC since

maintenance and nuclear munitions training had been consolidated into a single course in

1990 (Haynes, 1994). The fact that the course was undergoing instructional systems

development during the period of the evaluation was offered as a possible reason for some

low ratings of AMMOC's performance by these graduates. The report also acknowledged

deficiencies in the Core Automated Maintenance System (CAMS) training. All other

aspects of the report were positive and the course was ultimately hailed as one that

provided "performance-ready graduates..." (Department of the Air Force, 1991a: 2).

Bair and Gatewood's (1982) AFIT thesis examined the "managerial versus

technical" profiles of AMO jobs, the relevance of AMMOC curriculum, and the relevance

of the Air Force's career development philosophies for AMOs. Surveys of AMMOC

graduates indicated that AMOs regarded AMMOC's instruction on technical subjects as

"slightly useful," and AMMOC's instruction on management oriented subjects as "useful." The surveys also indicated that AMOs thought AMMOC was "too theoretical" (Bair and Gatewood, 1982: 76-77).

In the most recent AFIT thesis pertaining to AMO training, Frisbee (1988) focused on the "technical versus administrative" orientations of AMOs. In this case, Frisbee surveyed maintenance personnel in the Strategic Air Command (SAC) to determine their preferences for a "technically" oriented AMO versus an "administratively" oriented AMO. Frisbee found that maintenance personnel desired AMOs who were equally oriented with administrative and technical skills (1988: 76-77). One apparent premise of Frisbee's study was that training provided to AMOs should reflect the orientations for AMOs needed by the gaining organizations.

Both of the above theses were seemingly pursued under the premise of a dissatisfaction with AMO training. This is apparent from both studies' reference to a general officer's assertion that AMMOC was incapable of providing students with the needed skills (Bair and Gatewood, 1982: 11-12; Frisbee, 1988: 2-3). The TER and both AFIT theses employed methodologies that were predominantly quantitative, and tended to focus on either training curriculum or customer opinion. Conversely, through the use of a qualitative methodology, this thesis focuses on "training system" processes which ultimately lead to training curriculum and customer opinion.

Training and Instructional Systems Development

The Department of Defense defines training as "instruction and applied exercises for the acquisition and retention of skills, knowledge, and attitudes required to accomplish military tasks" (Department of Defense, 1987: 1). Likewise, the purpose of Air Force technical training is to impart the knowledge and skills required to qualify for an Air Force

Specialty (AFS). AMMOC is classified as "resident regular" technical training which denotes AFS initial or advancement training (Department of the Air Force, 1994c: 5-8).

Instructional Systems Development. The Air Force adopted Instructional Systems Development (ISD) as its method for developing training in 1965. According to Air Force Handbook 36-2235, *Information for designers of instructional systems*, ISD is a "conceptual adaptation of the systems engineering process to the problems of developing, implementing, and evaluating instruction" (Department of the Air Force, 1993c: 2-3) and is intended to develop relevant instruction that can impart the needed "skill, knowledge, and attitude" to satisfy job performance (1993c: 2-3). ISD is based on the following key concepts.

> [1] The instruction...is determined by job requirements.
> [2] Instruction requirements are based on a behavioral analysis that results in measurable, observable objectives.
> [3] Instruction is provided only on that portion of the job requirements that the student has not already mastered.
> [4] Measurement is keyed to the objectives, and students are measured against criteria rather than in comparison to a norm.
> [5] The instruction is student oriented....
> [6] The student and the instructor both know the instructional goals and when they have been attained.
> [7] If the system doesn't teach, it may be the fault of the system design....
> (Department of Air Force, 1993c: 13-14)

Shown in Figure 2-1 is the Air Force's recently revised model of ISD. This ISD model portrays the *processes* and *functions* associated with training development. An important characteristic of the new ISD model is that it recognizes that *processes* of instructional systems development transcend the organizational *functions* of management, support, administration, and product delivery. Another significant modification is the ISD model's emphasis on Quality Air Force (QAF) philosophies such as customer focus, teamwork, empowerment, and continuous evaluation.

The ISD model presented in Figure 2-1 is only a conceptual model; it does not precisely illustrate the activities involved in training development. Each of the processes depicted in Figure 2-1 can involve a multitude of activities. The precise activities required for development of a particular course depend on factors such as training objectives, complexity of subject matter, available time, resources, and number of students who require training (Department of the Air Force, 1993c: 13). The following paragraphs explain the general nature of the processes involved in ISD.
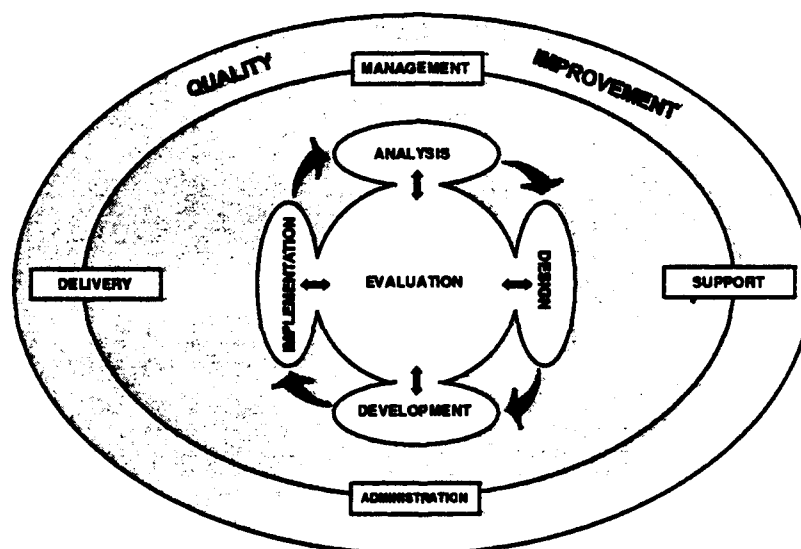
Figure 2-1. ISD Model
(Department of the Air Force, 1993c: 15)

Analysis. In this phase of ISD, occupational requirements are analyzed to determine training requirements. It is important to understand that job requirements do not necessarily translate into training objectives. Rather, training should be developed only for those job tasks which trainees have not already mastered. Information on job tasks is typically collected through occupational surveys and observation of individuals who are already performing the job of interest. In addition to occupational analysis,

2-10

further analysis must consider the needed resources for conducting training and the nature of the training's target audience (Department of the Air Force, 1993c, 43-60).

Design. This phase begins with developing learning objectives which will satisfy the training requirements determined in the analysis phase. The next step is development of tests to measure student's achievement of the learning objectives. Review of existing instructional material, selection of instructional methods and media, and development of an instructional information management system should also accomplished in the design phase (Department of the Air Force, 1993c, 61-110).

Development. After the instructional system has been designed, a course syllabus is developed. The syllabus, otherwise known as the plan of instruction (POI), identifies course objectives, sequence and duration of instruction, instructional methods, instructional materials, equipment, instructor guidance, and lesson plans. Once the POI has been developed, resources such as lesson plans and instructional materials must be developed and validated. Validation of instruction is accomplished through internal review of the instructional system, and by testing the system on actual students. Any problems revealed during validation should be corrected prior to progressing to the next phase of development. Finally, the instructional management information system designed in the previous phase is installed in the development phase (Department of the Air Force, 1993c, 111-135).

Implementation. The step after validation of the instructional system is to implement and maintain the new system under real world conditions. Operation and maintenance of the system will require that the organizational functions of management, support, administration, and delivery are effective. Furthermore, course evaluation and customer feedback are of great importance in determining if a return to other phases of development is warranted (Department of the Air Force, 1993c, 136-177).

Evaluation. Evaluation of the instructional system should occur throughout all phases of development and implementation. In fact, an evaluation plan is devised early in the ISD process and is revised during each phase of development. Continuous evaluation is intended to assure adherence to Quality Air Force (QAF) philosophies during all phases of instructional systems development (Department of the Air Force, 1993c, 42).

The Air Force contends that the competent application of ISD will result in effective and cost efficient training (Department of the Air Force, 1993c, 14). However, competent application of ISD for AMO training involves a large number of organizations and a broad base of job skills and knowledge. As a consequence, fielding an effective training system is extremely complex and requires a systems perspective.

A Systems Perspective. According to Hayes, the military's efforts to implement Instructional Systems Development (ISD) have been hampered because "many training developers, administrators, and training device designers continue to operate solely in their own area without an awareness of the influence of other groups on their products" (1992: 258). In the AMO training system, these groups of people consist of individuals such as AMMOC students, their supervisors, people assigned to the organizations and major commands to which they are assigned, and the personnel who are part of the training system.

According to Hayes, such a wide spectrum of stakeholders results in a diversity of stakeholder interests which, in many cases, are conflicting. For example, an AMO assigned to a nuclear munitions storage activity at a B-52 wing has different training needs than an AMO assigned to a propulsion maintenance activity in C-17 wing. Differing stakeholder interests are not limited to customers of training. Hayes points out that at the Department of Defense level of management, reducing the budget is the primary goal, while training providers are interested in student throughput. Because of such potentially

conflicting goals, and a corresponding lack of a "true systems perspective," training

systems often become fragmented and suboptimized (Hayes, 1992: 261-267).

The Training System

In a search for improvement opportunities, an understanding of the global training

system to which AMMOC belongs is necessary. What follows is a broad description of

the organizations and processes that define this system. The system described is

composed of the activities within the 82nd Training Group which are pertinent to

AMMOC training operations and course development, the organizations with which these

activities interact, and AMMOC's external customers.

Because of the ongoing revision of technical training policy and the unavailability

of official documentation, a clear description of the training system was difficult to

develop. This systems perspective is based on published regulations, drafts of regulations

pending publication, the expertise of training practitioners assigned to Second Air Force

(2AF) and the 82nd Training Group, and the researchers' background in technical training.

The following description has been reviewed by the 82nd Training Group practitioners

who are cited throughout the remainder of this chapter.

Structure of Training

Air Education and Training Command (AETC) is responsible for recruiting,

training, and educating Air Force military and civilian personnel. Second Air Force (2AF)

is the component of AETC responsible for technical training and consists of four training

wings located throughout the United States (*Air Force Magazine*, 1994: 63-64).

AMMOC is assigned to the 82nd Training Wing at Sheppard AFB, Texas. Figure 2-2

below depicts the structure of training from AETC Headquarters down to AMMOC.

```
                          ┌─────────────┐
                          │    AETC     │
                          └─────────────┘
            ┌──────────────────┼──────────────────┐
    ┌───────────────┐  ┌───────────────┐  ┌───────────────┐
    │ Air University│  │ 2nd Air Force │  │ 19th Air Force│
    └───────────────┘  └───────────────┘  └───────────────┘
     ┌──────────┬──────────────┼──────────────┬──────────┐
┌──────────┐ ┌──────────┐ ┌──────────┐ ┌──────────┐
│37 Training│ │82 Training│ │81 Training│ │17 Training│
│  Wing     │ │  Wing     │ │  Wing     │ │  Wing     │
│(Lackland) │ │(Sheppard) │ │(Keesler)  │ │(Goodfellow)│
└──────────┘ └──────────┘ └──────────┘ └──────────┘
        ┌──────────┴──────────┐
  ┌──────────────┐   ┌──────────────┐
  │782 Training   │   │82 Training    │
  │  Group        │   │  Group        │
  └──────────────┘   └──────────────┘
                            │        ┌──────────────────┐
                            │────────│ Training Quality  │
                            │        │   Assessment      │
                            │        └──────────────────┘
      ┌──────────┬──────────┼──────────┬──────────┐
┌──────────┐ ┌──────────┐ ┌──────────┐ ┌──────────┐
│82 Training│ │361 Training│ │362 Training│ │363 Training│
│Support    │ │ Squadron  │ │ Squadron  │ │ Squadron  │
│Squadron   │ │           │ │           │ │           │
└──────────┘ └──────────┘ └──────────┘ └──────────┘
                            │        ┌──────────────────┐
                            │────────│   Operations      │
                            │        └──────────────────┘
    ┌──────────┬──────────┼──────────┬──────────┐
┌──────────┐ ┌──────────┐        ┌──────────┐
│Aircraft   │        │Weapons    │
│Maintenance│        │Systems    │
│Flight     │        │Support    │
└──────────┘        │Flight     │
                    └──────────┘
┌──────────┐ ┌──────────────────┐ ┌──────────┐
│Military   │ │Maintenance        │ │Aircraft   │
│Training   │ │Management Flight   │ │Principles │
│Flight     │ │                    │ │Flight     │
└──────────┘ └──────────────────┘ └──────────┘
                            │        ┌──────────────────┐
                            │────────│Training Development│
                            │        │   Element         │
                            │        └──────────────────┘
      ┌──────────┬──────────┼──────────┬──────────┐
┌──────────┐ ┌──────────────┐ ┌──────────┐
│Other      │ │    AMMOC      │ │Other      │
│Courses    │ │               │ │Courses    │
└──────────┘ └──────────────┘ └──────────┘
```

Figure 2-2. Technical Training Organizational Chart
(Department of the Air Force, 1994b; *Air Force Magazine*, 1994: 63-64)

The Customer. In accordance with ISD, the justification for AMMOC is based on its customers' needs for training. Consistent with Thomas' assertion, we define AMMOC's external customers as: 1) its students; and 2) other people who benefit from the trainees' enhanced job performances (1992: 75). AMMOC's customers are captive. AMMOC is a mandatory requirement for an officer's progression through the aircraft maintenance officer career field; no other official source of training is available.

As noted by Bair and Gatewood (1982), AMMOC's customers are a diverse population of individuals. First, officers enter the AMO career field with a variety of educational and occupational experiences. Some have no aircraft maintenance experience while others possess substantial hands-on aircraft maintenance experience. Similarly, the educational backgrounds of AMMOC students are also diverse. While the Air Force desires AMOs with educational backgrounds in either engineering, management, or the physical sciences (Department of the Air Force, 1991b: 11-15 - 11-16), these desires do not constitute firm educational requirements. In fact, occasionally AMMOC encounters students who possess degrees in academic disciplines such as psychology or English. Because of the variety of missions and weapons systems associated with the different major commands, a diversity of job requirements exists among the population of AMOs. Therefore, providing exactly what the customer needs is an extremely demanding challenge for AMMOC.

According to ISD, customer training needs are defined by knowledge and skill requirements for the job, and upon the aptitudes of the trainees (Department of the Air Force, 1993c: 18). Training curriculum is based upon task and knowledge requirements which are agreed upon by the Air Force career field manager (AFCFM) and major command functional managers (MFMs) primarily during Utilization and Training Workshops (U&TW) (Department of the Air Force, 1994c, 24-25).

Utilization and Training Workshop (U&TW). The U&TW is a forum that assembles expertise throughout the Air Force to determine educational and training requirements for the AMO career field, and to evaluate current methods of satisfying these requirements (Department of the Air Force, 1994a: 4). Workshop participants include the AMO AFCFM, MFMs, AMMOC's training manager, the Air Force Manpower and Personnel Center (AFMPC), the Air Force Occupational Measurement Squadron, the Air Force Institute of Technology (AFIT), and other representatives from AMMOC and the 82nd Training Group (Department of the Air Force, 1994d). U&TWs are conducted on an "as-needed" basis (Department of the Air Force, 1994a: 4). The most recent U&TWs were conducted in 1987 and 1994 (Haynes, 1994).

The primary product of the U&TW is the Career Field Education and Training Plan (CFETP), a document that charts the educational and training requirement for members of a particular career field throughout their entire careers (Department of the Air Force, 1994a: Atch 1, Part I). A major component of the CFETP is the Course Training Standard (CTS) which identifies the major subject areas, specific training tasks, and proficiencies that must be achieved by AMMOC students (Department of the Air Force, 1994c: 44-48). Table 2-2 below presents typical training tasks contained within the 1992 AMMOC CTS.

Table 2-3. Typical AMMOC Training Objectives
(Department of Air Force, 1993b: 4-9)

Identify facts about nuclear theory
Identify facts about powered support equipment
Identify facts about maintenance officer additional duties
Identify responsibilities of maintenance production managers
Identify principles of aircraft maintenance productions planning

Essentially, the CTS is a contract between AMMOC and the numerous organizations which rely on AMMOC for training, and should in fact reflect the customers' training needs. Identification of customer requirements may come from a number of sources such as occupational survey reports, customer feedback collected by the training group, and members of the U&TW such as Air Force and major command representatives. Once established, modification of the CTS requires the approval of the AFCFM and coordination of MFMs . Following the U&TW, the training manager is responsible for preparing and obtaining approval of these documents (Department of the Air Force, 1994c: 20-45).

Development of AMMOC Curriculum. In accordance with the CTS, the 82nd Training Group is tasked with designing a course that will satisfy the knowledge and skill requirements. In the process of training development, two other course control documents are derived from the CTS--the Course Chart (CC) and the Plan of Instruction (POI) (Department of the Air Force, 1994c: 64- 78).

Table 2-4. Excerpt from Course Chart
(Department of the Air Force, 1993a: 4)

Course Material - UNCLASSIFIED

Block IX - Production Planning and Problem Solving   66 Hours TT
Monthly Aircraft Utilization Schedule (11 hrs); Emergency War Order Planning (8 hrs);
Weekly and Daily Aircraft Utilization Scheduling with DCM standup Briefings (46 hrs);
Course Critique and Graduation (1 hr). End-of-Course Appointments (2 hrs).
(Equipment Hazards and Personnel Safety Integrated with above Subjects)

                                                              68 Hours Total

The CC defines the sequence of subject areas, the duration of instruction for each training objective, and the course's overall length. The duration of the training for each training objective, and the course as a whole, are defined by AMMOC and the training

group, and should be based on the appropriate time required to provide the instruction (Haynes, 1994). Table 2-4 presents a portion of the AMMOC's CC.

The final course control document is a two-part Plan of Instruction (POI). Part I of the POI is a course syllabus derived from the CC and CTS. It defines for each major subject area: the specific training objectives; specific lesson content and duration for each objective; and the training methods, instructional materials (i.e., visual aids, student handouts), training devices, and instructional guidance. Part II of the POI is a teaching guide which instructors follow while providing training (Department of the Air Force, 1994c: 64-78). The table below presents a typical excerpt from the POI Part I.

Table 2-5. Excerpt from Plan of Instruction Part I
(Department of the Air Force, 1993e: 9)

5. Maintenance Production Manager's Responsibilities	4
a. Identify responsibilities of maintenance *production managers.* CTS: 20g Meas: W	(4)
(1) Squadron Commander Responsibilities (2) Maintenance Supervisor Responsibilities (3) Branch Chief Responsibilities (4) Production Superintendent's Responsibilities (5) Flight line Expediter's Responsibilities (6) Shop Chief Responsibilities	

82nd Training Group. Development of training primarily involves four agencies within the 82nd Training Group: AMMOC, its respective Training Development Element (TDE), Training Plans, and Evaluation. AMMOC, TDE, and Training Plans are all assigned to the 362nd Training Squadron. Within the 362nd Training Squadron, AMMOC and TDE are aligned under the Maintenance Management Flight, and Training Plans is assigned to Operations. Evaluation is a staff function aligned under the 82nd

```
                    ┌─────────────────┐
                    │ 82 Training Group│
                    └─────────────────┘
                             │         ┌──────────────┐
                             │─────────│  Evaluation  │
                             │         └──────────────┘
      ┌──────────────┬───────┴────────┬──────────────┐
┌─────────────┐ ┌─────────────┐ ┌─────────────┐ ┌─────────────┐
│ 82 Training │ │ 361 Training│ │ 362 Training│ │ 363 Training│
│Support      │ │ Squadron    │ │ Squadron    │ │ Squadron    │
│Squadron     │ │             │ │             │ │             │
└─────────────┘ └─────────────┘ └─────────────┘ └─────────────┘
       ┌──────────────┐                 │
       │  Operations  │─────────────────│
       └──────────────┘                 │
              │                         │
       ┌──────────────┐                 │
       │Training Plans│                 │
       └──────────────┘                 │
              │                         │
       Training Managers                │
```
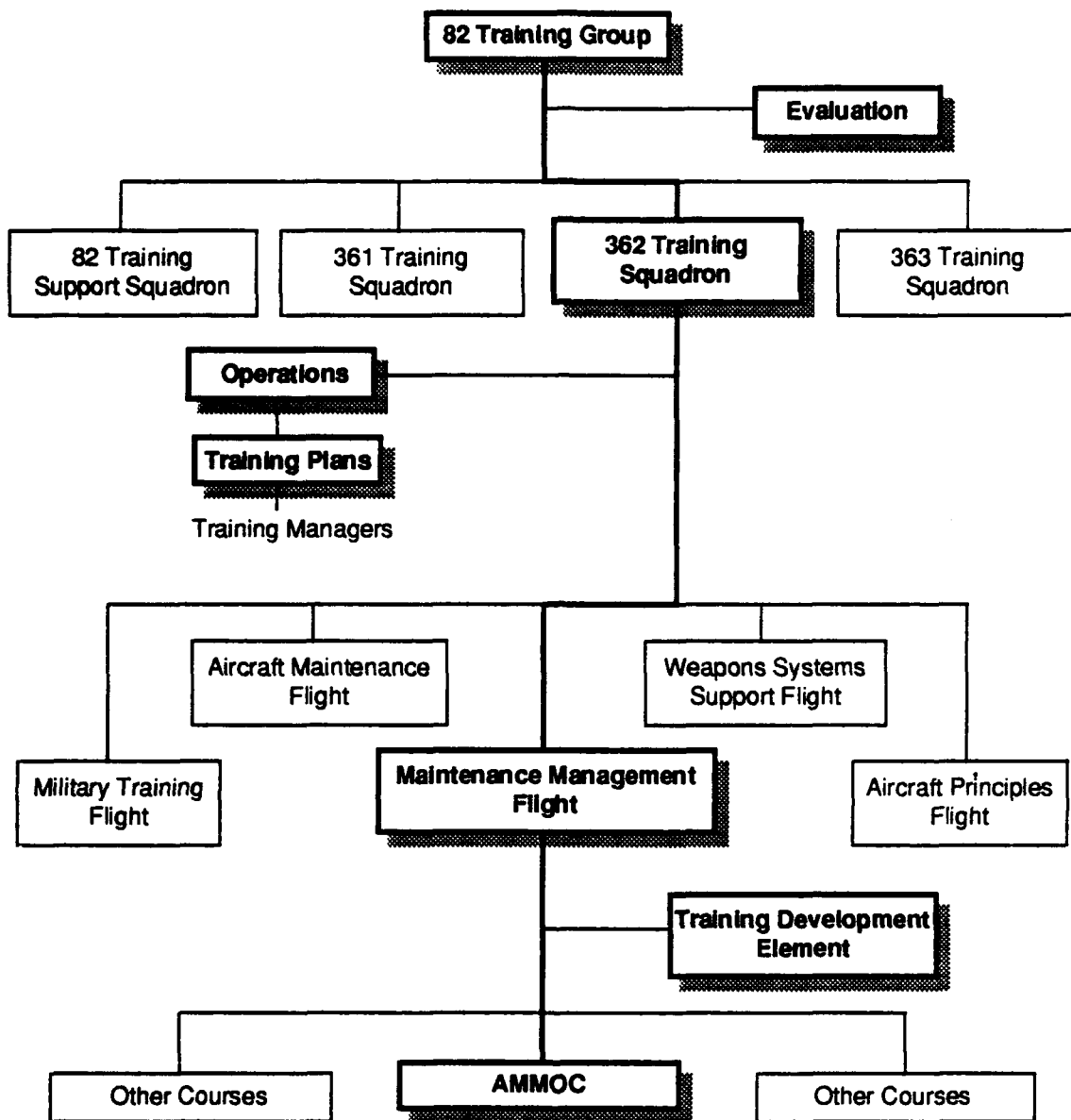
Figure 2-3. Organizational Chart of Pertinent 82nd Training Group Activities
(Department of the Air Force, 1994b)

Training Group. Figure 2-3 presents an organizational chart of the pertinent 82nd

Training Group activities. We are unaware of any published policy that specifically

delineates the responsibilities among Training Plans, Training Development, AMMOC,

and Evaluation. Nonetheless, the following organizational responsibilities were obtained

through a series of informal telephone and personal conversations with 82nd Training Group personnel. These responsibilities are not all inclusive, but are the most relevant concerning AMMOC training development and operation.

Aircraft Maintenance and Munitions Officers Course (AMMOC). AMMOC is the "point of contact" in the training of AMOs. AMMOC delivers the training to the customers. However, AMMOC is responsible for far more than product delivery. Except for development of the CTS, AMMOC is responsible for virtually all course development including researching, planning, developing, evaluating, and updating course materials such as lesson plans, student handouts, tests, and audiovisual materials. Furthermore, AMMOC is responsible for maintaining student records and counseling students. The AMMOC instructor staff consists of 16 instructors who must accomplish the previously mentioned responsibilities for basic AMMOC and three short courses (Dalton, 1994).

Training Development Element. The Training Development Element consists of three people and is aligned under the Maintenance Management Flight. Like the training manager, a single training specialist is allocated to the oversight of the aircraft maintenance officer, maintenance data systems analysis, and maintenance scheduling career fields. TDE oversees development of course control documents such as the Course Chart (CC) and the Plan of Instruction Part I. In coordination with AMMOC personnel, Training Development establishes the time and emphasis placed on each unit of study, the continuity between units, and the level to which students should be trained on each item. Training Development also coordinates course control documents through the Training Manager to other agencies to obtain approval. Additionally, Training Development assists AMMOC with the preparation of lesson plans, tests, student handouts, and audiovisual materials. Finally, Training Development assists AMMOC in resolving training deficiencies (Haynes, 1994).

Training Plans and the Training Manager. The Chief of Training Plans is assigned to the Director of Operations in the 362nd Training Squadron. The Chief of Training Plans oversees the development and planning of training for more than 200 technical training courses within the 362nd Training Squadron. The Chief of Training Plans supervises nine training managers who manage the technical training development and planning for a multitude of aircraft maintenance career fields (Shoffner, 1994).

The training manager's responsibilities regarding AMMOC primarily involve oversight of course training development and scheduling of students for the courses under his span of control. As shown in Figures 2-4 and 2-5, the training manager is an important link in communications between AMMOC and the remainder of the training system. The training manager interacts with Second Air Force (2AF), the Air Force Manpower and Personnel Center (AFMPC), the Air National Guard (ANG), and the Air Force Reserve (AFRES) in managing the flow of students through AMMOC. He is also an intermediary between AMMOC and the AFCFM and MFMs in the development of the CTS and CFETP. The training manager who oversees training for the AMO career field is also responsible for managing training for the maintenance data systems analysis and the maintenance scheduling career fields. In total, AMMOC's training manager is responsible for the oversight of eleven courses (Lawlor, 1994).

In developing class schedules, the training manager primarily interacts with 2AF through an on-line computer based scheduling system called Simulated Modeling for Allocation of Resources for Training (SMART) (Lawlor, 1994). Through SMART, forecasts of Trained Personnel Requirements (TPR) are provided to the training manager by 2AF. The training manager is tasked to build course schedules that can accommodate the forecast student flow within the constraints of the courses. The schedule for each AMMOC class specifies class start and graduation dates, and the number of students in each class.

2AF coordinates class scheduling with AFMPC, ANG, and AFRES through another automated system called the Air Force Training Management System (AFTMS) (McLaughlin, 1994). ANG, AFRES, and AFMPC provide 2AF with TPR forecasts, which 2AF subsequently forwards to the training manager through SMART. The class schedule built by the training manager is provided to 2AF through SMART, and then to the other organizations through AFTMS. At this point, the ANG, AFRES, and AFMPC assign trainees to the classes allocated by the training manager (Shoffner, 1994). It should be noted that these organizations can, and sometimes do, informally communicate over the telephone. Presented in Table 2-4 below is a model of the communications involved in student scheduling.
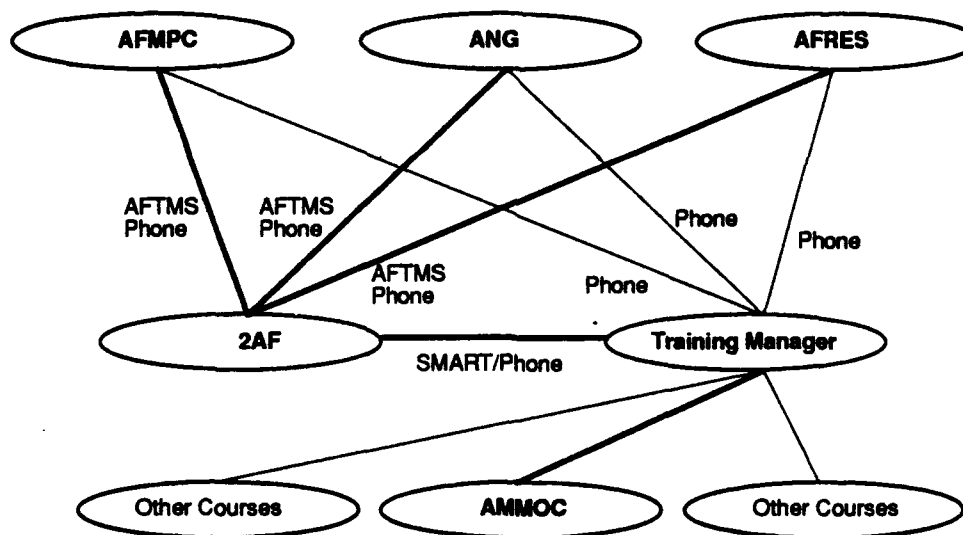
Figure 2-4. Communications Model for AMMOC Student Scheduling

Training managers also communicate with Air Force career field managers and major command functional managers in developing and obtaining approval for the CTS. Normally, the CTS is agreed upon by these managers during U&TWs. Once the workshop is complete, the training manager is responsible for developing a Course Training Standard (CTS) and a Career Field Education and Training Plan (CFETP). Once

2-22

these documents are approved, training managers do not normally pursue modification of them outside of the U&TW forum. Training managers regard the Air Force career field manager as AMMOC's primary customer representative, and usually do not interact with the major command functional managers (Lawlor, 1994). Presented in Figure 2-5 below is a model of the lines of communications with the AFCFM and MFMs in developing the CTS. Because of the infrequent nature of U&TWs (an interval of seven years between the most recent ones), we have excluded U&TWs from this model which is intended to depict communications under routine circumstances. The dashed lines depict lines of communication which are rarely used.
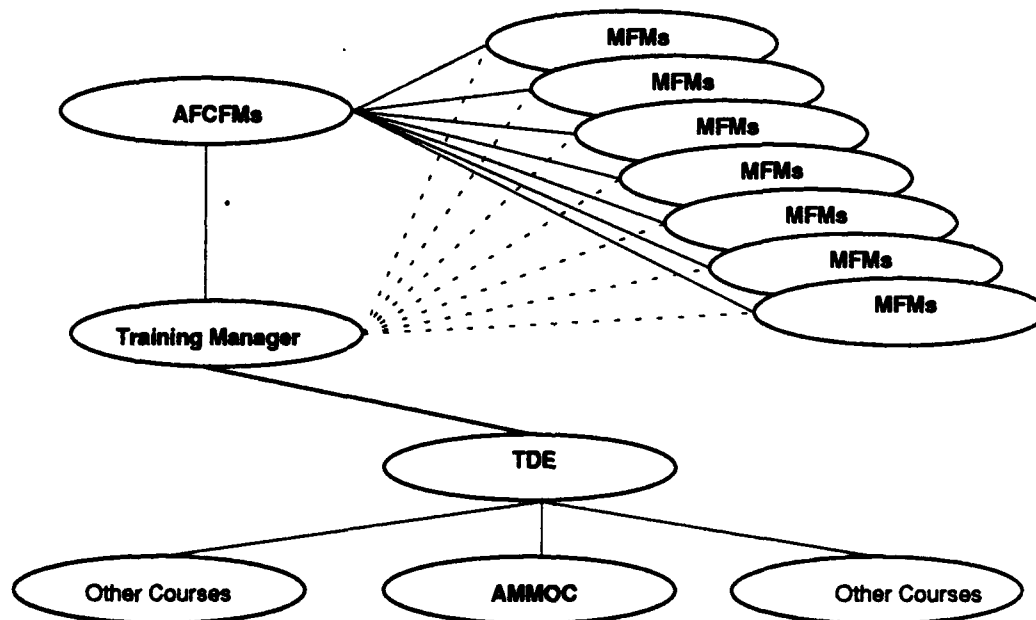
Figure 2-5. Communications Model for CTS Development

Evaluation. Training groups are required to maintain a Training Quality Assessment Program (TQAP) (Department of the Air Force, 1994e: 1). As depicted earlier in Figure 2-2, Evaluation is an 82nd Training Group staff function. Evaluation supports more than 300 resident and exportable courses administered by the 82nd

2-23

Training Group. This program is designed to provide meaningful feedback to technical training courses from their customers through a number of internal and external customer feedback mechanisms (Speights, 1994).

Internal feedback is gathered to help assess the effectiveness of the instructional system, improve support, and identify exemplary people and resources. Internal feedback is typically derived from student critiques, instructional reviews, student counseling, and training statistics. Student attrition and failure rates are examples of statistics that may be of value in identifying potential problems with training (Department of the Air Force, 1994e: 1). End-of-course critiques consist of two products. One is a 42-item questionnaire administered to each graduating student to solicit feedback not only on the quality of instruction, but also on base support services. The other product consists of criticisms and improvement ideas generated by graduating classes during group brainstorming sessions (Speights, 1994). Furthermore, individual students are free to submit course critiques at any time (Dalton, 1994).

External feedback is gathered to determine the abilities of graduates to perform their jobs, and to determine if revision of training is needed. The following are common forms of external feedback gathered for technical training courses (Department of the Air Force, 1994e: 2).

Occupational Surveys Report. Occupational survey reports (OSRs) are useful not only in designing future training, but also in assessing the usefulness of current training (Department of the Air Force, 1994e: 2). OSRs can provide information such as what tasks are required to perform a particular job, who performs them, their difficulty, and how often they are performed. This information may be obtained from a variety of methods such as questionnaires, observations, interviews, and review of publications. Occupational surveys are conducted by the Occupational Measurement Squadron at

Randolph AFB, Texas (Department of the Air Force, 1993d: 46). The most recent OSRs pertaining to AMMOC were conducted in 1994 and in 1980 (Wilcox, 1994).

Training Evaluation Report (TER). TERs provide an overall assessment of training for a particular course by considering all available feedback, both external and internal. External feedback is collected from graduates and their supervisors some period after graduation in the form of Training Quality Reports (TQRs), Field Evaluation Questionnaires (FEQs), Graduate Assessment Surveys (GASs), and field interviews. Internal measures included in the report typically consist of graduation, failure, and elimination rates (Speights, 1994). TERs are not conducted on an ongoing basis for any particular course, but are normally pursued when there is an indication that a problem may exist (Department of the Air Force, 1994e: 3). The most recent training evaluation for AMMOC was in 1991 (Haynes, 1994).

Training Quality Report (TQR). TQRs are an avenue for supervisors of graduates to identify training deficiencies, and to identify cases where too much training was provided. These reports are initiated in the field, and are eventually provided to the appropriate training groups for action. TQRs are infrequently received from the field for any training course (Speights, 1994). No TQRs pertaining to AMMOC have been received in several years (Haynes, 1994).

Field Evaluation Questionnaires. At the present time, FEQs do not solicit feedback on a regular basis for all courses. Instead, they are employed when a particular course is the subject of a TER. Graduates and their supervisors are mailed FEQs four to six months after graduation. FEQs are usually based on the course training standard (CTS) and solicit feedback on specific CTS items. FEQs mailed to supervisors ask supervisors to rate the graduates performance of each CTS item. FEQs mailed to graduates ask graduates to rate the adequacy of training on specific CTS items. Graduates and supervisors are also asked if training on specific CTS items have been used by the

graduates. The FEQs are then analyzed to determine what percentage of graduates use training on particular CTS items (Speights, 1994; Department of the Air Force, 1994e).

Graduate Assessment Survey. Graduate Assessment Surveys are mailed to 100 percent of the supervisors of graduates from enlisted initial skills training and their supervisors. These surveys consist of four questions regarding the attitude and abilities of the graduates (Department of the Air Force, 1994e: 16). Presently, graduate assessment surveys are not used in assessing AMMOC graduates (Speights, 1994).

Customer Service Information Line. The Customer Service Information Line (CSIL) is a 24 hour telephone line possessed by Evaluation within each training group for receiving customer inquiries and other feedback from the field (Department of the Air Force, 1994e: 2). The phone number is publicized in graduate assessment surveys and in the Course Training Standard (CTS). However, graduate assessment surveys do not presently pertain to AMMOC (Speights, 1994), and the distribution of the CTS is restricted (Department of the Air Force, 1993b: 1).

Field Interview. Field interviews are personal interviews, in the field or over the telephone, with recent graduates, their immediate supervisors, or others who are familiar with the performance of the graduates. These interviews normally focus on the effectiveness and currency of training (Department of the Air Force, 1994e: 2). Field interviews are primarily a tool for establishing a rapport with customers in the field; in AMMOC's case, field interviews are not conducted in numbers great enough to yield statistical significance (Speights, 1994).

Chapter Summary

This chapter provided background information needed to understand the importance and relevance of this research. This chapter summarized relevant research and described the Aircraft Maintenance Officer (AMO) career field, AMO training, and the

training system in which AMMOC exists. Chapter III presents the methodology for achieving the research objective and answering the investigative questions presented in Chapter I.

III. Methodology

Chapter Overview

This chapter describes the methodologies used to answer the investigative questions presented in Chapter I. We first reintroduce the basic issues associated with this thesis, and then introduce the concept of focused synthesis. Focused synthesis was the methodology used to compile and analyze the background information presented in Chapter II. After a brief discussion of focused synthesis, we describe a two-round Delphi technique that was implemented to obtain the opinions of AMMOC instructors on the guidance and support provided to AMMOC. The specifics on how the Delphi questionnaires were developed, structured, administered, and analyzed are presented.

Background

Past research concerning AMO training has generally focused on AMMOC course curriculum and customer satisfaction, and suggests a significant level of dissatisfaction with AMO technical training over the past decade (Bair & Gatewood, 1982: 11-12; Department of the Air Force, 1991a: 2; Frisbee, 1988: 2-3). These approaches were useful for analyzing training from the point of external customers. However, to initiate improvements in training processes, we focused on internal workings of the AMO training system with an emphasis on the QAF concepts of continuous improvement, customer focus, and empowerment. Recognizing that AMMOC instructors are the internal customers of the training system, we elected to acquire their views on the guidance and support afforded to AMMOC to achieve the following research objective.

Research Objective. Identify opportunities to improve the support and guidance provided to the Aircraft Maintenance and Munitions Officers Course (AMMOC)

<u>Investigative Questions</u>.

      1. What areas related to the guidance and support provided to AMMOC are the strongest candidates for improvement initiatives?

      2. How can the identified areas be improved?

Methodology

As is the case with just about any process improvement initiative, one must first understand the current processes and systems under investigation. To provide this understanding, we developed a descriptive accounting of the aircraft maintenance officer training system and relevant processes. Such a descriptive accounting serves three purposes. First, it provides the authors an understanding of how AMMOC and its support structure are organized and managed. Second, it provides background information for the readers of this thesis. And third, as is often the case, the background investigation itself serves as a source of improvement opportunities. The specific methodology we selected for conducting this background research is a methodology called "focused synthesis," which is described in the next section (Majchrzak, 1984: 59).

After establishing the descriptive accounting of the training system, we selected the AMMOC instructors as one of our sources for improvement opportunities. Instructors were selected because they are the internal customers of the training system. We used the Delphi technique to obtain the instructors' ideas and to establish a level of agreement on the issues and ideas generated. A description of Delphi and the rationale for using it are presented later in this chapter.

The two parts of this methodology, the focused synthesis and Delphi, were not independent. The descriptive accounting of the training development process contributed to the development of the questionnaires in the Delphi technique, and the responses from the questionnaires contributed to the descriptive accounting.

Limitations of the Methodology. During the course of this research, Air Education and Training Command was in the midst of reviewing and redefining its training policy. This review further challenged the development of our narrative description. Every attempt was made to incorporate the most recent policies into this research. However, it is possible that some of the policies relevant to this thesis changed during or immediately following the data collection for this study. If problems cited in this research have been corrected as a result of policy changes, then the intent of this research will have been met.

It is also important to recognize that we limited the panel of Delphi respondents to the population of the AMMOC instructor staff. We chose AMMOC instructors as the respondents because, as the providers of training and as the customers of the guidance and support they are afforded, they have the best perspective for suggesting quality improvements to the training process. Additionally, limiting the Delphi panel to AMMOC instructors restricted the number of respondents to a manageable level. We recognize that other credible sources of training expertise and improvement ideas were available.

Form of Results. Chapter IV includes a detailed discussion of the Delphi findings and Chapter V presents recommended improvements. Levels of agreement among the instructors for each of the improvement opportunities are also provided as part of Appendix G and H so that the readers may verify for themselves the results of our Delphi procedure. The remainder of this chapter presents the detailed methodology used in this research.

Focused Synthesis

A descriptive accounting of the training development system is presented in Chapter II as part of the background information for this thesis. This accounting of the training development system was derived through a process known as "focused synthesis."

Focused synthesis is somewhat akin to traditional literature reviews by involving the selective review of written materials and existing research findings relevant to the particular research questions. However, focused synthesis differs from traditional literature reviews by discussing information obtained from a variety of sources beyond published articles. For example, a typical synthesis might include discussions with experts and stakeholders, congressional hearings, anecdotal stories, personal past experience of the researchers, unpublished documents, staff memoranda, and published materials. (Majchrzak, 1984: 59)

In our particular "focused synthesis," we relied on Air Force regulations, drafts of pending Air Force regulations, informal discussions with training practitioners, unpublished documents, researchers' backgrounds in training, and results of the Delphi procedure. Our synthesis of a descriptive model was particularly difficult due our geographical separation from AMMOC, and the unavailability of up-to-date regulations. Therefore, our synthesis relied heavily on one researchers' travel to Sheppard AFB, Texas, where information was gathered through discussions with training practitioners. Informal conversations with 82nd Training Group, Second Air Force, and Air Force Manpower and Personnel Center were also important bases for the descriptive model presented in Chapter II. As formulation of the description progressed, portions of it were mailed to 82nd Training Group practitioners for their review for accuracy. Corrections were made accordingly.

Delphi Technique

According to Linstone and Turoff, the Delphi technique is a controlled communication process for developing consensus among a panel of experts (1975: 3). "Project Delphi," an Air Force sponsored research project conducted by the RAND Corporation in the 1950's, marked the first known use of this technique. The objective of this initial application of Delphi was to ascertain the consensus opinions of experts in predicting Soviet targeting of U.S. industrial sites. This group of experts was administered a series of questionnaires to obtain their opinions. Between rounds of

questionnaires, the experts were exposed to the anonymous responses of the other participants. This process established a reliable consensus of opinion among the experts. Today, the Delphi technique is a common tool employed by military and civilian researchers for obtaining the consensus opinion of experts (Linstone & Turoff, 1975: 10).

The general form of the Delphi technique is still the same today. It involves acquiring the opinions of experts, selectively providing the experts feedback on the responses of other participants while maintaining a level of anonymity, and then polling the experts again for their opinions (Linstone & Turoff, 1975: 5). Klassen and Whybark highlight the importance of the feedback process by noting that, "the feedback to the respondents at each iteration encourages them to evaluate and weigh the opinions of others in forming their next response" (1994: 386-387).

The major difference between the original Delphi technique and the techniques of today is in the expanding application of the Delphi technique. If the Delphi technique is viewed as a communication process, as proposed by Linstone and Turoff, then "there are few areas of human endeavor which are not candidates for application of Delphi" (1975: 4). The following prior uses of Delphi demonstrate its broad application:

- Planning...of curriculum development
- Delineating the pros and cons associated with potential policy options
- Developing causal relationships in complex...social phenomena
- Exposing priorities of personal values, social goals (Linstone & Turoff, 1975: 4)

Linstone and Turoff go on to explain that the application itself should not be the determining factor for using Delphi. It is often the circumstances surrounding the problem or issue which justify the use of Delphi, such as:

[1] The problem does not lend itself to precise analytical techniques but can benefit from subjective judgments on a collective basis

[2] The individuals needed to contribute to the examination of a broad or complex problem have no history of adequate communication and may represent diverse backgrounds with respect to experience or expertise

[3] More individuals are needed than can effectively interact in a face-to-face exchange

[4] Time and cost make frequent group meetings infeasible

[5] The efficiency of face-to-face meetings can be increased by a supplemental group communication process

[6] Disagreements among individuals are so severe or politically unpalatable that the communication process must be refereed and/or anonymity assured

[7] The heterogeneity of the participants must be preserved to assure validity of the results, i.e., avoidance of domination by quantity or by strength of personality ("bandwagon effect") (Linstone & Turoff, 1975: 4)

Though each of the properties above may have partially justified using the Delphi technique for this research, the primary properties which justified its use are 1 and 4 above.

Armstrong identifies several advantages to using Delphi. First, Delphi lends itself to administration though the mail--a significant advantage for us because we are geographically separated from the instructors. Second, Delphi is, "a technique that is acceptable to organizations. It sounds fancy, yet the users can understand it" (Armstrong, 1985: 119). Finally, Armstrong cites other studies that provide evidence that, "*Delphi is more accurate than traditional group meetings*" (1985: 119).

Implementation of the Delphi Technique

To complete our research objective and answer the associated investigative questions, we developed and administered a two-round Delphi procedure. Our Delphi procedure was adapted from an Air Force Institute of Technology (AFIT) thesis by Kettell and Ziegler (1992). The purpose of our application of the Delphi technique was to identify, from the AMMOC instructors' perspective, what areas of the training system

external to AMMOC could be improved, and to solicit ideas on how to implement improvements.

Participants. The Delphi was administered to 18 AMMOC instructors in the first round, and 17 AMMOC instructors in the second round. One of the instructors left AMMOC between the two rounds. The AMMOC instructors had varying degrees of maintenance and instructional experience. Maintenance experience ranged from two instructors with no practical maintenance experience to seven instructors with six or more years of maintenance experience. Cumulative instructional experience ranged from six instructors with less than two years experience to six instructors with more than 6 years experience. Relative to AMMOC instructional experience, nine instructors had less than two years experience and three had more that 6 years experience. Of the seventeen instructors who participated in the second round, six were civilian and 11 were officers. It is also worth noting that nine of the seventeen participants had filled non-instructional maintenance positions within the last four years

Sponsorship. To generate a high level of interest in our research, we pursued and obtained sponsorship from the Maintenance Policy Division at Headquarters, United States Air Force in Washington, DC. On our behalf, Maintenance Policy Division notified the 82nd Group Commander of this research and requested his cooperation in allowing the administration of questionnaires and the conduct of informal interviews with his group staff. Maintenance Policy Division's letter to the 82nd Group Commander is presented in Appendix B.

Advance Letter of Notification. Emory and Cooper suggest that an advance notification may improve response rates (1991: 334). We provided such notification a week in advance of mailing out the first round questionnaires to the instructors. The letter, presented in Appendix C, informed the instructors of their selection for this procedure and introduced them to the subject of our research. We also attempted to

generate a genuine interest in the research by emphasizing that the results would be presented to the Air Force. Finally, we stressed the importance of their participation in the study.

Development of the First Round

Our first priority was to establish a basic set of topics that would generate an interest in our research and serve as a stepping stone for the identification of improvement opportunities. This set of topics was derived from notes taken during a 1992 Quality Improvement Workshop in which the instructors identified problems affecting AMMOC. The general problem areas included quality measurement, course content, course operations, student administration, reference materials, morale, funding, decentralized control, equipment, and facilities (AMMOC, 1992). Within each problem area cited were specific issues pertaining to the problem areas. We classified each of the specific issues as either internal or external to AMMOC's control. Because the focus of this study is on external factors to AMMOC, we based the first round on those issues that we determined through subsequent research as primarily external to AMMOC's control.

As suggested by Dillman, we used a series of easy close-ended, short response questions as "icebreakers" (1978: 123). Our questions consisted of demographic questions to ascertain the instructional and maintenance experience of the instructors (see Appendix E). We believed such demographics of the instructor population might have been useful in the analysis of the responses if significant disparities among the respondents existed. The last three close-ended questions were designed to place the instructors in a quality improvement orientation by increasing their awareness of Quality Air Force initiatives.

The remainder of the first round questionnaire consisted of open-ended questions intended to "stimulate free thought, solicit suggestions, probe people's memories, and

clarify positions" (Dillman, 1978: 87). We attempted to maintain the problem-seeking questions as neutral as possible by soliciting both strengths and weaknesses of the particular areas of interest. We thought neutral questionnaire items were needed to help assure that respondents would not feel threatened or offended by the questionnaire.

Like Kettell and Ziegler (1992), we presented the questionnaire in a format that shortened its apparent length. The questionnaire was divided into four sections, A through D, and then subdivided into numbered subject areas. Within each major subject area, lower case alphanumerics were used to further delineate questionnaire items where required (see Table 3-1). The apparent length of the questionnaire was further reduced by printing it on both sides of the paper.

Table 3-1. Numbering Format for Round One.

Section B: General Quality Issues

1. CUSTOMER ORIENTATION.

    a. Who is AMMOC's primary customer?

    b. How does AMMOC communicate with its primary customer?

Questionnaire Pretesting. As suggested by Emory and Cooper, the questionnaire was pretested to evaluate and refine it (1991: 376). Three copies of the original questionnaire were sent to former AMMOC instructors. They were asked to complete the questionnaires and to comment on the structure and clarity of the questions. Two of the three were completed and returned. Based on these two responses, we deleted two topics, facilities and international officers, and condensed the areas concerned with student scheduling and administrative tasks. Our objective in implementing these

changes was to shorten the questionnaire. Several questionnaire items were also modified to improve their clarity.

      First Round Questionnaire Administration. Questionnaire administration was significantly facilitated by the 82nd Training Group Commander's appointment of an AMMOC instructor as a point of contact (POC) for our research. All questionnaires were mailed to the POC who distributed the questionnaires to the eighteen participants. Respondents were asked to complete and return the questionnaires within two weeks of receipt. Each questionnaire was accompanied by an addressed return envelope that could be used to return the responses via the Air Force distribution system or through our POC. The POC also followed up with the respondents. By reminding the instructors to return the questionnaires and re-emphasizing the importance of this research, we believe the POC's efforts significantly improved our response rate.

      Each questionnaire included a cover letter (Appendix D) from our sponsor, the Maintenance Policy Division at HQ USAF. The cover letter, like the prequestionnaire letter, described our research and emphasized that the instructor's opinions were a vital contribution to our research. Furthermore, the letter explained, that as Air Staff-sponsored research, the questionnaires were an excellent opportunity for AMMOC to influence future technical training policy. The questionnaire itself (Appendix E) assured the respondents that all responses would remain anonymous, and indicated that their participation was purely voluntary.

Development of the Second Round Questionnaire

      Our objective in developing the second round questionnaire was to measure each respondents agreement or disagreement with the ideas expressed by the other respondents in the first round. This was a particularly difficult task because of the relatively large number of Delphi respondents and the number of topics addressed on the first

questionnaire. To facilitate this process, the written comments from each question in the first round were compiled into a single document. Several issues became apparent through the compilation and analysis of the first round responses.

First, several of the questions were satisfactorily answered which precluded asking them again in the second round. For example, in response to the question, "In your opinion, how effective are the lines of communication between AMMOC and the various organizations (Operational MAJCOMs, MPC, AETC, Air Staff, etc.) involved in the system of training and training development?," 15 of the 16 participants expressed the position that communications need improvement. Additionally, 12 of these 16 respondents expressed that communications are extremely poor. Because of this overwhelming response, we saw no need to re-address this issue in the second round.

Second, many of the responses expressed essentially the same ideas. In an effort to simplify the second round, these responses were combined into one idea or statement. Many of the responses also contained multiple ideas. These statements were separated and presented individually.

Third, responses to some questions overlapped. We took the liberty to move responses to the areas to which the responses were most applicable. For example, under the area of empowerment we asked the question, "As an instructor, what authority should you have which you currently lack?" Several of the responses concerned course control documents, a topic explicitly addressed in another section of the questionnaire. Likewise, other responses to the empowerment question were also addressed in other sections of the questionnaire. To shorten the length of the second round questionnaire, empowerment related items were presented in other sections of the questionnaire and the empowerment section was deleted. Responses that did not relate to a specific area were moved to the general issues area at the end of the questionnaire.

Fourth, as expected the first round generated issues that were not specifically addressed in the first round. For example, we did not specifically pursue barriers to effective training in the first round. After receiving the first round responses, it became apparent that many of the statements presented could be classified as barriers to effective training. As a result, we presented a list of these barriers in the second round for the respondents to evaluate.

One other modification in the second round was the addition of a question concerning customer feedback. Between the time we administered the first questionnaire and the second, we discovered standard feedback mechanisms for obtaining feedback on technical training performance. We created a question that would allow each instructor to present their opinion on how effective or ineffective the uses of these measures and reports were for providing AMMOC with meaningful feedback.

<u>Second Round Structure</u>. The format of the second round questionnaire is similar to the format used by Kettell and Ziegler (1992). The questionnaire topics and associated ideas from the first round were placed in a tabular format. For each idea, the respondents were provided with a choice to either "strongly agree," agree," "disagree," or "strongly disagree" (see Table 3-2). As highlighted by Kettell and Ziegler, this measurement scale "differs from the well-known Likert Scale which uses the fifth response 'undecided'" (1992: 4-20). Like Kettell and Ziegler, we wanted the respondents to provide a "clear-cut" response--in essence to vote for or against the particular ideas (1992: 4-20). If respondents were adamant about maintaining a neutral position, they had the option of not responding, even though that option was not expressly provided.

Table 3-2. Format for Second Round Feedback Questions

	2. CUSTOMER ORIENTATION: The first round responses identified the individuals or organizations listed below as AMMOC's customers. Please rate your agreement/disagreement with each as a customer.	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE
A	AMMOC students				
B	Supervisors of AMMOC graduates				

The "No Response" column in Table 3-3 and found in the questionnaire in Appendix G was added to the questionnaire after the original questionnaire, without the "No Response" option, was administered to the instructors. The reason the column was added after administering the questionnaire was to facilitate the tabulation and presentation of the results.

Table 3-3. Format for Second Round Response Tabulation

	2. CUSTOMER ORIENTATION: The first round responses identified the individuals or organizations listed below as AMMOC's customers. Please rate your agreement/disagreement with each as a customer.	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE	NO RESPONSE
A	AMMOC students					
B	Supervisors of AMMOC graduates					

Respondents were encouraged to comment on their responses and to provide any additional thoughts. To accommodate this request, space was provided on the questionnaire with instructions to reference specific questionnaire items. The format of

the second round survey was simplified by including only two major sections: Section A for demographic questions, and Section B for the remainder of the questions.

We asked demographic questions again in the second round for the same reason they were included in the first round. These questions served as "icebreakers" and provided useful analysis information in cases where significant disparities might have existed among the instructor population.

Validity. Validation of the second round instrument was accomplished in two forms. First was an internal review by the researchers for clarity of each questionnaire item. Unlike the first round instrument, the second round instrument was not administered to former AMMOC instructors prior to its administration to the AMMOC instructor staff due to constraints on the availability of the former instructors. Instead, this type of validation was conducted by the actual respondents concurrently with the questionnaire's administration. During and after administration of the second round questionnaire, the researchers corresponded with a few of the respondents concerning the usefulness of the questionnaire items. While this method of validation did not allow for correction of the items prior to the questionnaire's administration, it did allow for the identification of unreliable items which were then excluded from researchers' consideration in drawing conclusions. This procedure was worthwhile. Respondents did identify that several of the questionnaire items lead respondents to particular responses. As a result, the researchers reviewed the questionnaire and responses to identify items that were either leading, or were confusing to the respondents. Such items are identified in Chapter IV.

Second Round Questionnaire Administration. Again AMMOC's point of contact (POC) significantly eased the administration of the second round questionnaire. Only 17 questionnaires were mailed for the second round because one of the instructors was reassigned from AMMOC without a replacement. We asked the instructors to complete and return the questionnaires within 10 days. The questionnaire consisted of

close-ended questions and required less time to complete than the first round. Our point of contact conducted a follow up with the respondents during this period to again increase the response rate. As in the first round, an addressed envelope accompanied each questionnaire in case the instructors wanted to return their responses through the Air Force distribution system.

The cover letter for the second questionnaire (Appendix F) was signed by the researchers instead of the Maintenance Policy Division because an excellent rapport had been established with the instructors during the first round. Our letter thanked the instructors for their participation in the first round and asked them to participate in the second round. We also explained that the second round consisted of edited responses from the first round to shorten the length of the questionnaire. The editing process was explained to ensure none of the respondents would be offended because verbatim responses were not presented. Finally, we re-emphasized the importance of their participation in this research.

Analysis of the Delphi Results

First Round Analysis. The analysis of the first round was partially described earlier as part of the description of the development process for the second round questionnaire. To start, we compiled the written comments from each respondent for each question. We then analyzed the responses to see if there were general trends within each question. Common ideas or thoughts were grouped for presentation back to the respondents. The main purpose of the first round was to refine the list of areas susceptible to improvement and to acquire ideas for initiating improvement. However, if the responses essentially agreed on the answer, the questions were not re-addressed in the second round.

<u>Second Round Analysis</u>. The close-ended question format significantly simplified the second round analysis. The responses of each of the instructors were tallied on the questionnaire in Appendix G that had been modified to include a "No Response" column. Additionally, any comments that justified dissenting positions or qualified a response were provided. The initial analysis of these results consisted of evaluating the aggregate response for each question by comparing the number of "strongly agree" and "agree" responses to the total number of participants. After determining the level of agreement on the responses, then the level of emotion was assessed by examining the ratio of "strongly agree" and "strongly disagree" responses to the total number of participants. A statistical analysis of the data is presented in Appendix H. The four statistical parameters calculated for each question were the population mean (μ), the population standard deviation (σ), the percent of instructors who agreed ($\%_{Agree}$) with the statement presented, and the percent of instructors who provided "strong" positions ($\%_{Strong}$). The equations used were,

$$\mu = \frac{\sum_{i=1}^{n} x_i}{n} \tag{1}$$

$$\sigma = \sqrt{\frac{n\sum_{i=1}^{n} x_i^2 + \left(\sum_{i=1}^{n} x_i\right)^2}{n^2}} \tag{2}$$

$$\%_{Agree} = \frac{n_{StngAgree} + n_{Agree}}{17} \times 100 \tag{3}$$

$$\%_{Strong} = \frac{n_{StngAgree} + n_{StngDisagree}}{17} \times 100 \tag{4}$$

where n = number of responses, and x = value assigned to each response (strongly agree=4, agree=3, disagree=2, strongly disagree=1).

The researchers looked for general trends in the data and general themes across responses. It was not the intent of this thesis to draw a line at a point where ideas above the line should be implemented and the ones below thrown out. The subjective value and feasibility of each idea is left to the members of the training system under analysis and the readers of this thesis. The researchers' analysis of the results is presented in Chapter IV. The subsequent recommendations are presented in Chapter V.

Summary

This chapter presented the methodology for answering the investigative questions from Chapter I. We introduced the reader to focused synthesis as a method for describing the AMMOC training and training development process presented in Chapter II. This chapter also explained the two round Delphi technique employed to obtain the opinions of AMMOC instructors on improvement opportunities and ideas. The first round of the Delphi further developed improvement opportunities derived from a 1992 AMMOC Quality Improvement Workshop. The second round developed the levels of agreement among the instructors concerning the potential barriers to effective training and other ideas expressed in the first round. Finally, the questionnaire analysis process was explained.

Chapters IV and V present the findings of the Delphi process, provide an analysis of those findings, and provide recommendations for improving the policies and support provided to AMMOC.

IV. Findings and Analysis

Chapter Overview

Chapter III detailed the Delphi technique applied to determine what opportunities exist for improving the guidance and support provided to AMMOC, and how to take advantage of such opportunities. This chapter presents the findings and analysis of the Delphi questionnaires that were administered. First, response rates and demographic profiles of the participants are presented. The chapter then presents the specific findings and analysis for each major topical area addressed in the questionnaires.

Background

The purpose of the first round, and its open-ended questionnaire format, was to obtain, from the AMMOC instructors, a variety of insights on the guidance and support provided to AMMOC. The results from the first round were compiled and analyzed to identify areas susceptible to improvement initiatives and to identify specific improvement ideas. During this first-round analysis, common ideas and thoughts were consolidated for presentation to the participants in the second round. In some cases, positions presented by the participants in the first round provided sufficient evidence to conclude certain areas were in fact strong candidates for improvement. If conclusions concerning these particular areas could be drawn from the first round, they were not re-addressed in the second round.

The purpose of the second round with its close-ended format was to obtain the AMMOC instructors' overall opinion on guidance and support issues raised in the first round and to identify their level of agreement on the improvement ideas submitted. The second-round analysis was based on the distribution of the responses for each question and on the common issues supported throughout the questionnaire.

The raw responses from the first round are not included in this thesis to protect the identity of the respondents. Unlike the first round responses, second round responses are included because they are not attributable to a particular individual. The second round responses are presented in Appendix G, and the statistical analysis of the second round is presented in Appendix H.

Before discussing the findings and analysis, recall from earlier chapters the following investigative questions:

      1. What areas related to the guidance and support provided to AMMOC are the strongest candidates for improvement initiatives?

      2. How can the identified areas be improved?

General Questionnaire Results

Response Rates. Sixteen of the 18 first-round questionnaires were returned for an 88.9 percent response rate. More significantly, 17 of 17 second-round questionnaires were returned for a 100 percent response rate. Only 17 questionnaires were mailed for the second round because one instructor was reassigned from AMMOC without a replacement. The second round response rate is especially significant because it was in the second round where respondents actually rated their agreement or disagreement with the statements and ideas presented in the first round. The second round results are presented in Appendix G. It should be noted that one of the participants in both rounds of the Delphi was not an active AMMOC instructor at the time of the Delphi administration. This individual was a former AMMOC instructor who had been reassigned to a computer-based-instruction (CBI) activity in support of AMMOC. Because this instructor possessed two years experience as an AMMOC instructor, and continues to support AMMOC in his new job, we consider him a legitimate participant in this study.

General Observations. The responses and response rates for the first and second round support the researchers' belief that the AMMOC instructors have a genuine interest in making AMMOC as effective and efficient as possible, and that they are an extremely valuable source of improvement ideas. It was also apparent from the first round responses that many of the participants put forth a substantial level of effort and thought into their responses, and easily surpassed our two-hour estimate for completing the first round.

Demographics. One of the benefits of a 100 percent response rate in the second round was a demographic profile of the entire AMMOC instructor population. The data, is presented in Appendix G. There appears to be a good cross section of instructional and technical experience, and over half of the respondents have been in a non-instructional maintenance position within the past four years. There were, however, two instructors who possessed no experience in aircraft maintenance except in their roles as instructors.

QAF Orientation. Two questions were asked during the first round concerning the respondents' awareness of Quality Air Force philosophies and improved business practices. The purpose of these two questions was threefold. First, as was the case in a previous AFIT thesis by Kettell and Ziegler, the questions were "icebreakers." Second, the questions were intended to establish a frame of reference for the remainder of the questionnaire. And third, they were used to determine the level of awareness of the instructors on QAF principles and business improvement practices (Kettell & Ziegler, 1992: 5-3). The questions and results concerning QAF and business improvement practices are presented in Table 4-1.

Along the same lines as the two questions in Table 4-1, a third question was asked concerning the respondents' participation in the 1992 AMMOC Quality Improvement Workshop. The question served two purposes. First, because the source of our general

Table 4-1. QAF and Improved Business Practice Questions and Results

---

9. The Quality Air Force philosophy advocates six basic principles: Leadership Involvement, Dedication to Mission, Respect of the Individual, Decentralized Organization, Empowerment at the Point of Contact, and Management by Fact. Were you aware of these principles?

    __10__ Yes __6__ No

10. In an effort to become more efficient and effective, DOD is encouraging, and in some cases directing, improved business practices. Were you aware of these initiatives? (Kettle & Ziegler, 1992: 5-3)

    __12__ Yes __4__ No

---

areas of interest originated from the notes taken during the workshop, we thought it might be useful to know if the population had changed significantly since then. We anticipated that the population had changed significantly because the course had moved from Chanute to Sheppard AFB since the time the workshop was held. Second, we wanted those who did participate in the workshop to view this research as a continuation of their efforts in 1992 and not as a duplication of that process. The question and the results are presented in Table 4-2.

Table 4-2. AMMOC Quality Improvement Workshop Participation Results

---

11. In 1992, a quality improvement workshop was conducted at Chanute AFB during which AMMOC personnel formulated mission and vision statements. Also identified were potential areas for improvement that were beyond the control of AMMOC. Were you a participant in this workshop?

    __5__ Yes __11__ No

Customer Orientation

Two questions were asked in the first round pertaining to customer orientation.

a. Who is AMMOC's primary customer?

b. How does AMMOC communicate with its primary customer?

The purpose for asking these two questions was to see what level of agreement exists among AMMOC instructors on who their primary customers are. TQM and QAF suggest service organizations must first know who their customers are in order to properly satisfy the customers' needs.

A compilation of all the first round responses identified five potential customers:

1. AMMOC students.

2. Supervisors of graduates.

3. Commanders of graduates.

4. MAJCOMs and MAJCOM equivalents.

5. Foreign governments of international students.

Recognizing that AMMOC probably does have more than one customer, a question was created for the second round in which the instructors expressed their agreement or disagreement as to whether each of the above is a customer of AMMOC (Appendix G, Question B.2). AMMOC instructors unanimously viewed the supervisors, commanders, major commands and foreign governments as customers. However, four respondents did not view the students as customers.

The second part of the first-round question was intended to addressed the means by which AMMOC communicates with its customers. This question was not as effective as we would have liked for two reasons. First, responses were somewhat dependent upon whom the participants identified as the primary customer in the first part of the question.

Secondly, some responses to the question addressed communications effectiveness, while others addressed the means by which AMMOC communicates.

Despite the fact that the question was interpreted in two ways, it was still evident that the overall tone of the responses was quite negative. Three of four respondents who addressed the effectiveness of communications asserted that no communication existed between AMMOC and its customer. Of the other responses which addressed the means of communicating with customers, most were seemingly very weak, and some were qualified by the respondent as insufficient. For example, one respondent said, "officially the communications go through major command channels.... Unfortunately, we call directly to the field...." The implication was that the official communication channels were ineffective. Three respondents indicated that Utilization and Training Workshops (U&TWs) were a primary mode of communication with customers. Recall from Chapter II that only two U&TWs have been conducted since 1987. Three respondents stated that the communication primarily resulted from informal interaction with students or through formal student critiques. And finally, some respondents indicated that primary communications transpired through occasional guest speakers from the field, a relatively weak form of communication.

There seemed to be no common theme among those who responded by identifying the means by which AMMOC communicates with its customers. This suggests that there probably is not an effective line of communication between AMMOC and its customers. This idea is consistent with the responses of those who interpreted the questions in terms of communication effectiveness. The responses to this question indicate that there probably are significant opportunities to improve customer communications.

Feedback

To gather more information concerning the effectiveness of communications between AMMOC and its customers, some supposedly established methods for soliciting customer feedback were presented in the second round. The following feedback mechanisms defined in AETCR 52-12 , *Training quality assessment*, were presented to the instructors in the second round:

1. Training Quality Reports (TQRs)
2. Field Evaluation Questionnaires/Training Evaluation Reports
3. Customer Service Information Line (CSIL)
4. Field Interviews
5. Occupational Survey Reports
6. Subject Matter Expert Reports
7. Graduate Assessment Surveys

While the responses were mixed, overall instructors rated these mechanism as fairly ineffective (Appendix G, Question B.3). In fact, only two of these feedback mechanisms, field interviews and graduate assessment surveys, were rated as effective by at least 50 percent of the respondents. Furthermore, four of the five remaining options received four or less favorable responses from the seventeen instructors.

Through further research presented in Chapter II, the researchers learned that none of these methods of customer feedback were presenting AMMOC with significant feedback: Graduate Assessment Surveys were not used at all for AMMOC; no TQRs had been received from the field in several years; only two occupational surveys had been conducted in the last 14 years; CSIL was unpublicized to AMMOC graduates; and field surveys were conducted only in small numbers. Given these facts along with the

responses to the previous question, it is evident that communication between AMMOC and its customers is quite minimal.

Communications

The following questions were asked in round one concerning the communications between AMMOC and the other organizations associated with AMMOC training and training development.

> **a. In your opinion, how effective are the lines of communication between AMMOC and the various organizations (Operational MAJCOMs, MPC, AETC, Air Staff, etc.) involved in the system of training and training development?**

> **b. How can communications be improved?**

The first question was intended to determine the instructors' perceptions regarding the effectiveness of communication with organizations that should contribute to AMMOC's instructional efforts. The responses indicated an overwhelming perception by the instructors that these communications are ineffective. Fifteen of sixteen respondents indicted some level of negativity and twelve of sixteen indicated strong negativity by including comments such as, "100% ineffective," "Not very good," "Marginally effective," and "Very limited in formal reviews and nonexistent in informal data gathering." From these responses it was evident that communication between AMMOC and the agencies that support AMMOC is ineffective and provides a significant opportunity for improvement.

The second part of the question solicited ideas from AMMOC instructors on how the communications could be improved. The respondents' ideas were compiled and presented back to the instructors in the second round (Appendix G, Question B.4).

4-8

Most of the ideas submitted for improving AMMOC's communication with outside organizations received strong support from the instructors. The ideas which received strong support are presented below in Table 4-3.

Table 4-3. Strongly Supported Ideas for Improving Communications

---

1. Provide AMMOC access to electronic-mail for correspondence with organizations throughout the Air Force.

2. Permit and fund instructor TDYs to operational wings to maintain AMMOC's currency with field operations and policies.

3. Place AMMOC on distribution for changes in policies and regulations.

4. Include AMMOC in pertinent message traffic for informational purposes to maintain AMMOC's currency on unit level maintenance policies and practices.

5. Establish points of contact within MAJCOMs, research centers and depots. These points of contact could forward information to AMMOC.

6. Conduct surveys of former students and commanders.

7. Provide a system through which the various organizations may provide inputs or suggestions pertaining to AMMOC's training on an ongoing basis, not only at a U&TW conference.

Two of the improvement ideas received unanimous support. First, instructors believed Temporary Duties (TDYs) at operational wings would help maintain AMMOC's currency with field operations. Second, instructors believe AMMOC should be on distribution for changes in policies and regulations. These two ideas were also presented as suggestions for improving AMMOC's adaptability to change in the next section of the second round questionnaire.

Item seven in Table 4-3 suggests that a system be implemented that allows other organizations to easily access AMMOC regarding training issues. Item one, the

suggestion to provide e-mail access for AMMOC, would certainly serve as an avenue for soliciting feedback concerning training which was addressed in item seven. As expected, because these items are related, they received similar levels of support among the instructors. Likewise, item six concerning the survey of former students also received similar levels of support.

It is interesting to note that several of the communication improvement ideas could be initiated internally by AMMOC. AMMOC can place itself on distribution for relevant regulations and changes, and can identify points of contact within MAJCOMs. Furthermore, while the training group staff function of Evaluation is primarily responsible for soliciting feedback from graduates, we know of no rules that preclude AMMOC from also soliciting customer feedback. However, as discussed later, the question arises as to whether instructors have time for such initiatives, and whether organizational structure inhibits the open communications necessary to initiate direct communications with other organizations.

From the responses addressed in this and previous sections, there is strong evidence to suggest that communication between AMMOC, its external customers, and the training support system, is relatively ineffective and a strong candidate for improvement.

Adaptability to Change

Four first-round questions concerned the training and training development system's ability to adapt training to changes in maintenance and management concepts in the field. Two aspects of adaptability were emphasized; one on the system's responsiveness (timeliness) to change and the other on the system's flexibility in accommodating change (relative ease).

Responsiveness. The two questions relating to responsiveness were as follows:

     a. How responsive is the present system of training and training development to incorporating changes in maintenance and management concepts employed in the field?

     b. How can this system become more responsive?

Eleven of the fifteen responses (one no response) were negative in nature. The select answers presented in Table 4-4 capture the essence of the negative responses.

Table 4-4. Representative Responses Relating to Training System Responsiveness.

>   **a. How responsive is the present system of training and training development to incorporating changes in maintenance and management concepts employed in the field?**
>
> 1. Slow, because of the AETC layers of approval to POI [Plan of Instruction].
>
> 2. Not responsive at all. Too much time/approval needed to make changes. Instructors learn of changes in the field from STUDENTS!
>
> 3. Not very responsive since we are tied to the CTS (course training standard) identified by those above AMMOC (ex- Air Staff, MAJCOMs).
>
> 4. Training development is primarily the individual instructor's responsibility. Due to instructors in class without extended breaks, the development system is almost nonexistent.

The negative responses tended to focus on the constraints of the course training standard (CTS), insufficient time to conduct course development, and AMMOC's unawareness of impending changes in the field. Conversely, the two positive responses indicated that instructors do have some control over the training development process. However, we know from Chapter II that this development must occur within the confines of the CTS. Furthermore, one of the positive responses stipulated that the system was

responsive, but indicated that this responsiveness was contingent on AMMOC's awareness of required changes, and on the opportunity to incorporate such changes into lesson plans.

The second part of the question, "How can this system become more responsive?," yielded several ideas which were subsequently presented in the second round questionnaire. Unfortunately, when these ideas were presented back to the instructors, the questionnaire item was flawed. Instead of referring to "responsiveness," the question addressed "flexibility, " which was also the topic of the next second round question (See Appendix G, Question B.5.a). Because of the similarity between the concepts of "responsiveness" and "flexibility," we believe that the following improvement ideas displayed in Table 4-5, which received strong support in the second round, are still valid as improvement ideas.

Table 4-5: Ideas for Improving Training System Responsiveness

1. Allow instructors to go TDY and then update lesson plans.

2. Provide instructors time to conduct course development.

3. Establish a cadre of personnel for course development to relieve instructors of the burden of both developing and providing training.

4. Establish MAJCOM and Air Staff points of contact for AMMOC which include office symbols, names and telephone numbers.

5. Empower AMMOC staff to change the Course Training Standard (CTS) when changes in maintenance policies and practices warrant it.

6. Include AMMOC in pertinent message traffic for informational purposes to maintain AMMOC's currency on unit level maintenance policies and practices.

7. Improve communication between AMMOC, and USAF and MAJCOMs regarding impending changes to maintenance policies and practices.

As shown in Table 4-5, one idea was to empower AMMOC to change the CTS when changes in the field warrant it. With 14 of 17 respondents in favor of the idea, the support was not unanimous, but nonetheless quite high. The support of this idea was also consistent with some complaints during the first round that AMMOC's unresponsiveness is related to constraints imposed by the CTS. Recall from Chapter II that the CTS is essentially a contract between AMMOC and its customers, and establishes AMMOC's course objectives. It was noted in Chapter II that the forum for updating the CTS is the Utilization and Training Workshop (U&TW), which is a relatively infrequent event.

Support of other ideas were also consistent with previous questionnaire items on communications. Once again, instructor TDYs to operational wings, the establishment of points of contacts at major commands and Air Staff, and AMMOC's inclusion in pertinent communications concerning maintenance policies all received strong support in this section.

Consistent with the first round responses, instructors again identified opportunity for course development as a factor in improving responsiveness. For example, providing more time to instructors for course development received unanimous support from the instructors as a means for improving responsiveness. Finally, the ideas of more manpower for course development also received strong support. Recall from Chapter II that course design calls for eight hour training days. If instructor manning is limited and if instructors spend most of their time in the classroom, it certainly makes sense that manpower and time would be factors in AMMOC's responsiveness in incorporating changes to the course. This point is underscored in Section C, question 4, of the first round questionnaire which specifically addresses the relationship between course design and opportunity for course development. This idea was expressed as follows by one first round respondent.

Presently the course relies entirely upon the instructors to write, research, and update the material. There are no dedicated people or enough extra instructors to allow for good research and writing time. We need one or the other.

The issue of opportunity for course development was raised again and again throughout the questionnaire sections concerning scheduling, class hours, time for research, and course administration.

Flexibility. The next two questions from the first round concerning adaptability to change addressed the flexibility of the system.

c. How flexible is the present system of training and training development to incorporating changes in maintenance and management concepts employed in the field?

d. How can this system become more flexible?

As stated earlier, these questions were asked to determine how easily changes are incorporated. Although four of the sixteen responses were positive, the vast majority were quite negative. Once again common themes throughout the responses concerned the constraints of the CTS, poor communications, and insufficient time to incorporate authorized changes. It was also apparent that instructors were allowed to change their particular instructional blocks without much trouble provided they were aware changes were needed, provided they had ample time to incorporate changes, and provided the changes were consistent with the Course Training Standard (CTS).

In the second question above, question d, instructors were asked to suggest ways of improving the flexibility of the training system. Some suggestions were similar to the those for improving the responsiveness of the training system. For example, it was suggested that instructor be given time to travel to operational wings to research and incorporate new developments into their lesson plans. Some responses related to empowerment of instructors to have more control over class schedules, class sizes, and course content. As in previous cases, these ideas were presented in the second round

questionnaire to determine the level of support among all instructors. The ideas supported are presented in Table 4-6.

Table 4-6. Ideas for Improving the Flexibility of the Training System

1. Send instructors TDY to operational units to increase their awareness of current policies and practices.

2 Include AMMOC in pertinent message traffic for informational purposes to maintain AMMOC's currency on unit level maintenance policies and practices.

3. Give instructors inputs on planning course schedules, class sizes, and down times.

4. Distinguish course development responsibilities between AMMOC instructors and Training Development Element (TDE) personnel.

As expected, the second round questionnaire items concerning instructor TDYs and communications received strong support, just as in other sections of the questionnaire. Furthermore, the questionnaire item addressing empowerment of instructors to influence course schedules, class sizes, and instructor "downtimes" also received strong support which is consistent with repeated occurrences throughout the questionnaires where instructors asserted that more control over scheduling was needed and that insufficient time for course development was available to instructors.

The last improvement issue concerning flexibility dealt with the delineation of course development responsibilities between AMMOC instructors and Training Development Element (TDE) personnel. Apparently their is little guidance concerning where their responsibilities are split. This is one area were additional guidance for the process may be required.

4-15

Finally, one item in this section addressed management philosophies. After further analysis, the researchers considered this question as leading and did not include it in the formulation of conclusions regarding flexibility of the training system.

Instructor Performance Evaluation

Three questions were asked concerning instructor performance evaluation. They were:

a. How is the performance of individual instructors measured and evaluated?

b. What are the strengths and weaknesses of these measures?

c. How can AMMOC instructor performance evaluations be improved?

The intent of this question was to determine if there were meaningful forms of instructor evaluation, and if there were forms of instructor evaluation which were contrary to training effectiveness. Unfortunately, not many powerful ideas were generated by these questions.

Nearly every respondent mentioned the AETC Form 281, Instructor Evaluation Checklist, used by instructor supervisors to evaluate instructor classroom performance. These periodic evaluations entail the supervisors' observation and documentation of the instructor's performance in the classroom. Most of the comments were fairly neutral. However, two instructors did state that these types of evaluations were worthless and that no real instructor assessment takes place. Several respondents identified indirect means of evaluation such as student critiques and test score averages. Only one individual mentioned the content of instructors' lesson plans as a performance measure.

The second part of the question asked the for strengths and weaknesses of performance measures employed by AMMOC. Only four respondents cited strengths of the periodic supervisor evaluations. The strengths were that these evaluations provide

immediate constructive feedback to instructors and that they are reliable. However, ten respondents identified weaknesses related to the periodic evaluations. These included personal bias of the evaluator, lack of emphasis on course content, evaluator unfamiliarity with instructional material, and the infrequency of the evaluations. From the first round responses, it appears that there may be a significant level of dissatisfaction among instructors concerning the periodic evaluations. Because we were concerned with the length of the second round questionnaire, these strengths and weaknesses were not carried forward to the second round, and as a result we cannot say for certain what level of dissatisfaction exists. Instructor evaluation would be a good topic for future research.

The third part of this question asked for ideas for improving instructor performance. The suggestions pertained not only to the periodic evaluations, but also to some of the indirect measures of instructor performance as well. Three questions from this areas are presented in Table 4-7.

Table 4-7. Ideas for Improving Instructor Performance Measures

1. AETC Form 281 should place more emphasis on lesson content than instructor presentations skills.
2. Implement a more descriptive AETC Form 281 giving more specific expectations of performance.
3. Conduct informal evaluations in addition to formal evaluations.

Item 1, which suggests more emphasis on lesson content, was supported by less than half of the respondents. This is surprising because in the first round questionnaire many of the weaknesses relating to periodic instructor evaluations focused on the AETC evaluation form's emphasis on presentation skills as opposed to lesson content. The last two items in Table 4-6 did receive strong support with 14 of 17 respondents either

agreeing or strongly agreeing with the ideas. Five of the six remaining items in this section of the questionnaire did not receive strong support. One of the remaining items that was supported was determined to be leading during the analysis of these findings, and therefore did not yield any meaningful information.

Though there was some dissatisfaction expressed with the evaluation process, few of the ideas for improving instructor performance evaluation received strong support. As stated earlier, instructor performance evaluation would be a good topic for future research.

AMMOC Performance Evaluation

The previous questions focused on individual performance measures. Conversely, the following questions concern the performance of AMMOC as a whole.

      a. How is the performance of the AMMO Course measured and evaluated?

      b. What are the strengths and weaknesses of these measures?

      c. How should the AMMO Course be evaluated?

There were several methods identified for measuring and evaluating AMMOC performance. Three were indirect measures of performance such as student course critiques, test averages, percentage of students graduating, and number of students graduating. Others suggested AMMOC performance is evaluated by feedback mechanisms such as Training Evaluation Reports and field surveys. Four instructors stated that they knew of no measures of performance. Three instructors did not respond. Overall, it was evident from the first round responses that there was little awareness of any systematic method for evaluating AMMOC's overall performance.

The second part of the question asked respondents to identify strengths and weaknesses of AMMOC's performance measures. Only one instructor identified any strengths with the performance measures they had identified in the previous part of the

question. However, all twelve instructors who responded did identify various weaknesses with present performance measures. The third part of the question asked for instructors' ideas for improving AMMOC's performance measures. The few ideas presented in the second round questionnaire which received the strongest support are shown in Table 4-8 below.

Table 4-8. Ideas for Improving AMMOC's Performance Measures

1. Get an evaluation "expert" to develop an evaluation plan.

2. Annual questionnaire to field commanders about how our students are doing and what we can do to help them out.

3. Evaluate graduates' job performance in the field.

14 of 17 instructors agreed that AMMOC should have an expert develop an evaluation plan for AMMOC. This idea is consistent with the previous observation that there seemed to be little awareness among instructors of an existing systematic method of evaluating AMMOC. The other two ideas concerned the solicitation of feedback from the field. The instructors' support of these ideas are consistent with earlier responses to earlier questionnaire items that suggested a lack of effective communications with customers. The concept of course evaluation is very complex. Whether or not some of these measures such as student throughput and test scores are consistent with promoting quality training is debatable. Course evaluation is also an excellent topic for future research.

Empowerment

We asked a variety of questions concerning empowerment in the first round

a. As an instructor, what authority should you have which you currently lack? Why should you have this authority (what advantage is gained)?

b. What restrictions or requirements have been placed on AMMOC as a whole, by regulations or any other guidance, that make training more difficult?

c. Can the constraints in 6b. above be removed without adversely affecting the quality of training?

Two of sixteen respondents indicated they had all the authority they needed, and four did not respond. However, the remaining responses raised many of the same issues addressed in previous questions such as class schedules, time for course development, and modification of the CTS. Another issue addressed concerned the instructor's authority to control the length of the training day, an issue which received much attention in the first round questionnaire section on that subject.

Because most of these issues were specifically addressed in other sections of the questionnaire, the section on empowerment was eliminated from the second round. However, each response discussed above was presented in the second round questionnaire in the section most pertinent. Responses which did not neatly fit into an existing questionnaire category were consolidated and presented in the General Issues section at the end of the questionnaire.

The second part of the question sought to identify external constraints placed on AMMOC. In general, the responses were varied, focusing on issues such as manpower, course content, course length, instructor TDYs, student throughput, and U&TWs. Additionally, a few issues concerning constraints internal to AMMOC were addressed; however, these issues will not be discussed because they are beyond the scope of this thesis which is on external factors affecting AMMOC. As was the case with the previous question, the relevant responses were presented in the second round questionnaire under a topic other than empowerment. The third part of the empowerment question addressed whether the constraints identified in part two of the question could be eliminated without adversely affecting the quality of training. Every respondent who responded to the second

part of the question asserted that the constraints could be removed without degrading the quality of training.

Critique Program

Two questions were asked during the first round pertaining to the student critique program.

> **a. What are the strengths and weaknesses of the student critique program?**

> **b. If you could improve the usefulness of the student critique program, what would you change, and how?**

The purpose of this question was to identify opportunities to improve support and guidance beyond AMMOC's control. While many strengths and weaknesses were identified with the program, and while several suggestions were offered for improving the program, nearly all were within AMMOC's control. These items were included in the second round as a courtesy to AMMOC's supervisors under the premise that this feedback might be of use to them. Because AMMOC's internal affairs are not the subject of this thesis, these issues are not further addressed. It should be noted that several of these second round items have been found to be leading after further review and may not be useful.

Course Objective Development

We should point out that the terms "CTS objectives" and "course objectives" are used synonymously in our discussion. A couple of respondents indicated that these terms are not the same. Usually, course objectives are developed from CTS task and knowledge statements (Department of the Air Force, 1994c: 50). However, in AMMOC's case, the training objectives are taken verbatim from task and knowledge statements in the CTS. Therefore, the course objectives and CTS elements are the same for AMMOC.

Throughout the discussion that follows, we will continue to use the terms "course objectives" and "CTS elements" synonymously.

The purpose of this section was to determine if there were weaknesses in the current course objective development process, and to identify potential improvement opportunities. The questions asked in the first round were:

a. What are the strengths and weaknesses of the current method of developing course objectives [CTS elements]?

b. Do you know of a better method for developing course objectives [CTS elements]?

Four respondents did not respond to the first question. Nearly all the comments concerned weaknesses of course objective development. For example, four respondents commented on the nonresponsiveness of the CTS to changes in the field. Three contended that CTS items were vague, and that it was difficult to determine the intent of the CTS' authors. Two individuals addressed the actual development process, inferring that there was not enough field-level involvement developing CTS elements. Finally, two comments were positive. One respondent contended that CTS elements were precise and clearly defined, and another commented that once the CTS is changed, the course responds relatively quickly. All of these ideas were presented in the second round questionnaire to determine if there was agreement concerning the strengths and weaknesses of course objective development.

Of the seven weaknesses presented, six received fairly strong support. Two of the weaknesses concerned the vagueness of course objectives, and the difficulty associated with interpreting the meaning of CTS elements. Respondents generally agreed that both were weaknesses. However, a related questionnaire item that characterized course objectives as precise and clearly defined also received the agreement of about one half of the respondents. The reason for this apparent disparity is not clear. The two items that

were presented as weaknesses were accompanied by examples to clarify their meanings, and did receive similar levels of agreement among respondents. We believe these items were the more reliable, and conclude that instructors do view CTS items as vague. This conclusion is supported by another second round questionnaire item that suggests each CTS item be accompanied by a narrative statement which explains the intent of the CTS authors.

The two items that characterized the CTS as nonresponsive to changes in the field were also agreed upon by the majority of instructors. Finally, the respondents expressed that the relatively low level of proficiency required by the course objectives was also a weakness.

The second part of the question on course objective development asked instructors to suggest a better method of developing course objectives. Seven participants did not respond to this item. The relevant responses to this question were presented in the second round questionnaire. These items are shown in the table below.

Table 4-9. Ideas for Improving Course Objective Development

1. Develop an "on-line" system for developing and maintaining course objectives that is accessible by AMMOC, Air Staff, and the major commands.

2. AMMOC should be empowered to develop its own course objectives with the oversight of MAJCOMs and Air Staff.

3. AMMOC should be empowered to develop course objectives, and represent the various MAJCOMs in the process.

4. Course objectives should be developed with the involvement of maintenance leaders from operational units and MAJCOM staffs who range from company to field-grade ranks. The development process should include a review of current AMMOC lesson plans.

5. Each CTS element should have a short narrative statement outlining what aspects of the topic should be taught. This will convey the authors' intents pertaining to each CTS element.

The idea of an "on-line" system for developing and maintaining course objectives receive support from 15 of 17 respondents. Two items were presented concerning the empowerment of AMMOC to develop course objectives. The item that suggested AMMOC independently develop course objectives did not receive very strong support. However, the idea that AMMOC should develop course objectives with the oversight of the major commands received the support of 14 of 17 instructors. The remaining two items showed that instructors believed that CTS objectives should be developed with the involvement of maintenance personnel from the field, and that CTS objectives should be accompanied by a short narrative statement that conveys the intentions of the CTS developers. One additional question which received strong support in the second round questionnaire is not discussed here because the researchers determined that it was leading and therefore not useful.

Course Control Documents

The purpose of this section was to evaluate course control documents such as course training standards, course charts, and plans of instruction to determine if there are opportunities to improve these documents. The questions asked during the first round were,

> **a. What are the strengths and weaknesses of course control documents?**

> **b. If you could improve the usefulness of the course control documents by changing current regulations or guidance, what would you change, and how?**

The responses to these questions were similar to those to the previous questions concerning course objective development. For example, respondents again commented that CTS statement were too vague, that course control documents quickly become outdated, and that no master plan integrates the various course control documents. Two

respondents did identify a few positive aspects of course control documents such as training standardization.

The second part of the question solicited ideas for improving course control documents. Seven instructors did not respond to this question at all. Six ideas were suggested during round one and were presented in the second round questionnaire. Two of the six ideas did not receive strong support. Three that received unanimous support were determined to be leading and were not of any use. However, their was one item that did garner fairly strong support. Eleven of fourteen instructors agreed that AMMOC should be allowed to modify course control documents. This was consistent with questionnaire items in previous sections that suggested that AMMOC should be authorized to modify the CTS. However, the item in this section of the questionnaire was not as strongly supported. It was shown in Chapter II that AMMOC instructors already control all course control documents except for the CTS. It is possible that some instructors disagreed with this statement because they already have the control that the questionnaire suggests that they do not have.

Class Hours, Time for Research, and Course Administration

This was one of the areas where there was strong agreement in the first round. As a result, follow up questions were not asked in the second round. Three questions were asked concerning class hours, time for research, and course administration.

a. How do policies governing the minimum length of the training day affect the amount of time you have for research and course administration?

b. What do you think should be the policy on how instructors manage class time? Why?

c. What should be the minimum number of classroom hours per day? Should there be a standard training day?

In response to the first question, 12 of the 16 first round respondents indicated that the policies governing the minimum length of the training day did affect their ability to conduct research and/or the time available for course administration. Representative responses are presented in Table 4-10.

Table 4-10. Select First Round Responses Concerning the Length of the Training Day.

---

a. How do policies governing the minimum length of the training day affect the amount of time you have for research and course administration?

1. The training day is too long--8 hours of teaching...degrades instructor effectiveness and student retention rates.

2. There is no time for anything but instructing.

3. It hurts. Unless the instructor has a back up instructor or a break between classes there is little to no time to do research & lesson development.

4. There is no time for course research because we are required to keep students in class all day, even if material has been covered.

5. Current "policy" is unwritten. Classroom hours are 07:10 to 1620, with lunch from 11-1230. This current "policy" however is not enforced, so most instructors end teaching by around 1430-1500. Our problem in having time to research is back to back classes. Most blocks of instruction have only one primary instructor, some have a backup, but we don't use the backup to allow the primary to do research, only for leave & other special events.

6. Currently, we are required to teach 8 hrs per day. This means the instructor must attend to course development over lunch, on the 10 minute break each hour, or after normal duty hours. With back to back classes, instructors are afforded no "downtime" for course development.

When asked what they thought the policy on class time management should be, 11 of the 16 respondents specifically indicated the instructors should have direct control over the time spent in class. An additional three indicated that six hours of instruction would be

appropriate which would provide the instructor two hours for other responsibilities such as research, course administration, and additional duties. It would also give students two hours for student self study. Table 4-11 presents a few of the responses that summarized the key points made by the instructors to the question, what do you think should be the policy on how instructors manage class time?

Table 4-11. Select First Round Responses Concerning Class Time Management.

---

b. What do you think should be the policy on how instructors manage class time? Why?

1. 6 hrs teaching, 2 hrs course work and development, or two instructors per block and dedicated supervisors, or a staff of training development & course writers.

2. If we want to make it a reputable course, instructors need 1-2 weeks between classes to research; or develop a training development section to do research, LP's [Lesson Plans], Vis-aids. (Not our current TDB, they are glorified admin clerks, an added layer, with no added value) If somebody in the process made classes 6 students larger, we could easily handle the larger classes, separate new classes by 1 week, giving instructors time to train!, research, update, improve!, learn a little about quality!, and do additional duties.

3. Leave to the discretion of the instructor. They are officers and should be trusted to do a professional job.

In discussing the minimum number of classroom hours per day, 13 of the 16 respondents mentioned six hours in some capacity in their responses. Seven of the respondents set the minimum at six hours, three set six hours as the maximum, and three stated the standard training day should be six hours.

Scheduling

Scheduling was another area where there was a strong majority opinion presented by the instructors in the first round. Consequently, it was not directly addressed again in the second round. The first round question was,

What role, if any, should AMMOC play in the determination of class sizes, start dates, and graduation dates?

Ten of the sixteen respondents indicated that as a minimum AMMOC should be consulted in some form. Two of the ten said that AMMOC should have large control over class size, start dates, and graduation dates, and three said AMMOC should have complete control over the parameters. Three respondents expressed no opinion, and the other three commented on specific issues such as class size, class start and graduation dates. However, these individuals did not specify the role AMMOC should play. From the results, we found strong evidence to suggest that AMMOC's involvement in student scheduling was limited, and that AMMOC instructors desired more control over scheduling.

The instructors identified several benefits that could be achieved if AMMOC were more involved in scheduling. First, research time could be built in to the course by scheduling breaks between classes. Second, TDY pay to students could be saved through smarter scheduling of class start and graduation dates that shortened students period of absence from their home stations. Examples of poor scheduling included graduation dates the day after three day weekends, and a class start date which was scheduled one week before a two week Christmas break. Third, a few of the instructors pointed out that instructor leaves and shortfalls could be managed more easily if they were more involved in class scheduling.

Administration

One question was asked regarding instructor administrative responsibilities.

Are there administrative tasks imposed on AMMOC that can be streamlined or eliminated without adversely affecting training?

Only 6 of the 16 first round respondents provided substantial responses. Four of the six identified additional duties as particularly burdensome and difficult to accomplish--

4-28

a result of the limited time available to accomplish them. Since the issue of time was addressed in other areas under analysis, Administration, as a section, was omitted from the second round.

Other

This last section in the first round was a catch-all for other areas not specifically addressed elsewhere in the questionnaires. The questions were,

1. What other ideas do you have for improving the support provided to AMMOC?

2. Any other comments.

The improvement opportunities and improvement ideas generated in the first round questionnaire that did not fit into the specific sections included in the second round, were consolidated in a General Issues section in the second round for the instructors to review. Six of the general ideas suggested were either unanimously supported or strongly supported by the instructors. Two of these six questionnaire items were determined to be leading and were not useful. The other four are presented in table below.

Table 4-12. General Improvement Ideas Supported

1. Maintenance officers should be offered an incentive to become AMMOC instructors (e.g., choice of follow-on assignment).

2. Facilities should be improved.

3. Establish a library/research area for students and staff.

4. Institute job related exercises pertaining to topics such as mobility and battle staffs.

During validation of the first round questionnaire, questions pertaining to facilities were eliminated to shorten the length of the questionnaire. However, from the responses to item 2 in the table above, it seems that there is a high level of interest in facility

improvement. Facilities would be a good topic for further research. Presented below are some of the instructors comments concerning facilities.

        a. Our facilities are terrible the temperature is 90 plus inside in the summer and below 50 in the winter, this is not good for learning.

        b. Facilities are terrible considering emphasis on "Quality." There are new buildings for other courses coming to Sheppard (i.e. Lowry courses), but no plans for AMMOC.

Item 1 may be a partial solution to AMMOC's apparent manpower shortage. Given that funding is available, establishing a library should be within AMMOC's control. Finally, the desire to institute realistic exercises into the curriculum is consistent with the frequently expressed desire for AMMOC to exert more control over course content. It may be possible that the incorporation of such exercises may be permissible under AMMOC's current CTS.

Barriers to Effective Training

As explained in Chapter III, several respondents described circumstances in the first round which could be defined as barriers to effective training. We thought it would be useful to determine if AMMOC instructors did in fact regard these conditions as barriers, and if they did, how significant the barriers were. To accomplish this, we presented a list of these barriers in the second round for the respondents to evaluate (Appendix G, pg. G-4). We asked the respondents to first express whether each condition was a barrier. Secondly, we asked them to identify the ten barriers that they regarded as the most significant.

Unfortunately, while every instructor rated their agreement or disagreement with each of the barriers, seven did not identify the top ten barriers. In hind sight, the researchers should have split the two tasks into separate sections or provided a statement at the end of the question reminding the respondents to go back and rate the top ten

barriers. Despite some of the respondents' apparent confusion in completing this portion of the questionnaire, useful information was obtained. Table 4-13 presents the items which received the most votes as barriers to effective training. The table identifies the number of votes each item received as a top barrier and the number of respondents that either disagreed or strongly disagreed that the items were barriers to effective training.

The respondents who cast dissenting votes were not disagreeing with the validity of the statement, but dissenting with the fact that these conditions are barriers to effective training. All of these barriers are consistent with responses on these topics in other sections of the questionnaire. There were several other areas that were strongly supported as barriers, but were not top vote-getters as significant barriers. Table 4-14 includes all the barriers for which two or less dissenting votes were cast.

Table 4-13. Instructor's Top Five Barriers to Effective Training

1. Manning levels and back-to-back classes afford instructors inadequate time for conducting research and course development.   [10 votes] [0 disagree]

2. Restrictions on maximum class size and student throughput result in continuous back-to-back classes.   [7 votes] [3 disagree]

3. AMMOC lacks authority to modify the CTS.   [6 votes] [3 disagree]

4. Process for changing course length is difficult.   [6 votes] [1 disagree]

5. There is insufficient funding for student instructional materials.   [6 votes] [0 disagree]

Three general categories were not presented as barriers in the second round questionnaire. In hind sight, communications, scheduling, and facilities should have been included. Their exclusion was a result of an oversight on the part of the researchers. If

included, the researchers believe the three would have been rated as significant barriers. This assumption is based on responses in both the first and second round questionnaire.

Table 4-14. Instructor Identified Barriers with Two or Fewer Dissenting Votes.

1. Manning levels and back-to-back classes afford instructors inadequate time for conducting research and course development.   [10 votes]

2. Process for changing course length is difficult.   [6 votes]

3. AMMOC is not included on important message traffic pertaining to maintenance policies and practices.   [5 votes]

4. Vaguely worded CTS objectives make it difficult to determine the intent of the CTS authors.   [5 votes]

5. AMMOC instructors are frequently pulled from the course to fill other positions in the group.   [5 votes]

6. There is no incentive to streamline training because any resources saved are taken away.   [5 votes]

7. There is insufficient funding for student instructional materials.   [6 votes]

Summary

The responses from both the first and second round of the Delphi provided valuable information for identifying improvement opportunities for the guidance and support provided to AMMOC. The instructors were in fact significant resources for this process. The management in the training system that supports AMMOC should take special note of the responses for they represent the voice of their internal customer. The subjective value and feasibility of each idea is left to the members of the training system under analysis and the readers of this thesis. The authors present their own conclusions and recommendations in the next chapter.

V. Conclusions and Recommendations

Chapter Overview

The final chapter of this thesis ties together all the information presented in the previous chapters and answers the investigative questions. The chapter begins with a discussion on the issues surrounding this research and the relevance of the research to the effectiveness of the Aircraft Maintenance and Munitions Officers Course (AMMOC). Most significantly, this chapter summarizes the research findings, answers the investigative questions, and presents conclusions and recommendations.

Research Issues

The scope of this thesis was quite broad. The study dealt with *guidance and support*, which we defined as policy, resources, services, or anything else that affects AMMOC's ability to accomplish its mission. Because of the broad scope of this research, no particular topic was scrutinized in detail. Instead, this research attempted to provide a comprehensive view of the training system and to identify some general areas for future improvement efforts. By no means does this thesis preclude the need for future study in the area of technical training policy. To the contrary, presented in this chapter are areas of interest which should be the subjects of intense scrutiny by senior technical training managers.

Do not expect to arrive at the researchers' conclusions by reviewing only the responses to the second round Delphi questionnaire presented in Appendix G. The researchers conclusions are based on three primary sources--the open-ended responses to the first round Delphi questionnaire, the close-ended responses to the second round, and the descriptive model of the training system presented in Chapter II. Several of the topics from the first round were so overwhelming, we did not re-address them in the second

round; yet, the responses from the first round are significant and influenced our conclusions and recommendations. Unfortunately, we do not present the first round responses in their entirety due to the emotional nature of some responses and the need to protect the participants' anonymity. Excerpts of the first round responses which substantiate findings presented in this chapter are presented throughout Chapter IV.

Finally, the recommendations provided in this chapter are those of both AMMOC instructors and the researchers. We acknowledge that there are other credible sources of training expertise; however, we felt it was important to provide the instructors, as the "customer point of contact," a forum for providing their concerns and ideas which will hopefully benefit AMMOC and the system that supports it.

Review

Recall from Chapter I the following research objective and investigative questions:

<u>Research Objective</u>. Identify opportunities to improve the support and guidance provided to the Aircraft Maintenance and Munitions Officers Course (AMMOC).

<u>Investigative Questions</u>.

1. What areas related to the guidance and support provided to AMMOC are the strongest candidates for improvement initiatives?

2. How can the identified areas be improved?

<u>Results</u>. This study was successful both in identifying opportunities to improve the guidance and support provided to AMMOC, and in providing suggestions for capitalizing on these opportunities. The researchers found that opportunities to improve guidance and support are rooted in "conditions" that are contrary to effective training which exist under current guidance and support. Recommended improvements to current

guidance and support are aimed at improving these conditions which were cited by AMMOC instructors.

Summary of Findings

Feedback from the AMMOC instructors provides strong evidence that the conditions presented in Table 5-1 exist under the present system. As will be demonstrated later in this chapter, these conditions are also consistent with the descriptive model of the training system presented in Chapter II.

Table 5-1. Summary of Findings

1. Communication between AMMOC and its customers is ineffective.

2. Communication between AMMOC and rest of the training system is ineffective.

3. The training system supporting AMMOC is unresponsive.

4. Instructors are afforded insufficient time to accomplish course development.

5. Student scheduling is carried out without sufficient involvement of AMMOC.

The conditions in Table 5-1 translate into areas which provide strong improvement opportunities, which in turn, answer the first investigative question. Table 5-2 presents these areas related to the guidance and support provided to AMMOC which are strong candidates for future improvement initiatives.

Table 5-2. Candidates for Improvement Initiatives

1. Customer Communications

2. Training System Internal Communications

3. Training System Adaptability

4. Course Development Policy

5. Student Scheduling Policy

Improvement Through Empowerment

According to an Air Force white paper, *Air Force restructure,* empowerment strengthens lines of authority and facilitates accountability (Department of the Air Force, 1991d: 2). Throughout the remainder of this chapter, we will demonstrate that to a large extent, the conditions cited in Table 5-1 are beyond the control of the AMMOC instructor staff. By empowering AMMOC instructors with more authority and resources, these conditions may be brought within their control. If AMMOC instructors are not empowered to succeed, they cannot legitimately be held accountable for the course's overall performance.

Table 5-3 presents the recommendations of AMMOC instructors and the researchers for improving the conditions identified in Table 5-1. The recommendations originate from the analysis of the descriptive model presented in Chapter II and the analysis of both the first and second round Delphi.

On the following pages, the validity of each recommendation is substantiated. Some of the recommendations should be relatively easy to implement; however, others may require changes in organizational structure, increases in manpower, and increases in other resources. Such changes will help empower AMMOC to control the people and resources required to develop and provide training that is consistent with and responsive to the customers' needs.

Table 5-3. Recommendations for Improving of AMMOC's Guidance and Support

1. Determine and satisfy AMMOC's true manpower requirements, and refine training development and manning policy if necessary.

2. Decentralize Training Manager and Training Development Element (TDE) activities to AMMOC.

3. Decentralize Training Quality Assessment activities to AMMOC.

4. Provide AMMOC limited authority to implement changes to CTS in the absence of U&TWs.

5. Include AMMOC in HQ USAF and major command message traffic concerning maintenance policies and practices.

6. Authorize and fund instructor TDYs to operational wings.

7. Provide AMMOC direct access to E-mail.

8. Review AMMOC's needs for student instructional materials and fund them accordingly.

Course Development Opportunities

Opportunity for course development by the instructors is limited for several reasons. To allow more time for course development activities, our recommendations are to determine and satisfy AMMOC's true manpower requirements, and then to refine training development and manning policies if necessary.

Round one of the Delphi procedure indicated that AMMOC instructors view the current system of training as unresponsive. In round two of the Delphi, 16 of 17 instructors strongly agreed that manning levels and back-to-back classes afford instructors inadequate time to conduct research and course development, and rated this condition as a significant barrier to effective training. AMMOC instructors suggested that AMMOC

could become more responsive if additional time were available for instructors to accomplish course development.

The AMMOC instructor staff presently consists of 16 instructors for basic AMMOC and three short courses. The demands of the short courses leave a core of approximately ten instructors who are routinely available to operate and develop the basic course. Recall from Chapter II that the course design calls for eight-hour training days and a continual requirement for ten instructors in the classroom. It is common for these core instructors to spend 10 to 12 weeks in the classroom before receiving a two-week break during which course development and personal business may be conducted. This situation significantly limits opportunities to conduct course development (Dalton, 1994).

This problem is not simple, but rather a product of several interrelated factors. These factors include policies concerning training development and manpower, and the nonavailability of volunteers for AMMOC instructor duty. A long-term solution to this condition should focus on the evaluation and refinement of such policies which may be inconsistent with the development and conduct of quality training. The following paragraphs present a discussion of these important factors.

Technical training development policy is a potential constraint on course development time. According to a draft of AETCR 52-1, *Technical training development,* the standard training day is based on eight hours of training (Department of the Air Force, 1994c: 62). AMMOC's course design is consistent with this policy. If the course design accommodated a shorter training day, more time would be available to instructors for course development. However, such a change would require a course with fewer total hours of instruction, or one with more training days to provide the same number of hours of instruction. Training policy does permit up to two hours per day for supervised or directed study which is not currently included in AMMOC's course design (Department of the Air Force, 1993a; 1994c: 62).

Another important factor is the method for determining AMMOC's manning authorizations. AMMOC's manning authorizations are computed in accordance with a model presented in ATC Regulation 25-2, *Technical training course manpower standards*. This model's parameters include course length, maximum class size, number of instructors required for each block of instruction, and the annual trained personnel requirement (TPR) (Department of the Air Force, 1987: 8-11). An apparent underlying premise of this model is that there is a great deal of similarity among all technical training courses. It is unclear to the researchers if this manpower model considers the peculiarity of each course's curriculum and associated course development requirements. A review of Air Force Catalog (AFCAT) 36-2223, *USAF formal schools*, indicates that AMMOC's curriculum is somewhat broader than that of most other technical training courses. Assuming that AMMOC's curriculum is indeed broader than other technical training courses, it is logical to assume that more research is required to develop and maintain AMMOC curriculum than is required for other courses.

One suggestion offered during the Delphi was to assign an additional cadre of personnel to course development activities. This would relieve instructors of the burden of both instructing and conducting course development. Such a scheme is employed by the Squadron Officers School (SOS) at Maxwell AFB, Alabama, where approximately 14 officers are assigned to course development activities for a single course which is 195 hours in length (Trip, 1994). In contrast, AMMOC dedicates no personnel to AMMOC course development and maintenance for four courses with a combined length of 1106 hours (Dalton, 1994). Although, it is possible that some differences exist between course development requirements for AMMOC and SOS, there certainly seems to be a huge inconsistency between their manning policies.

Finally, the nonavailability of volunteers for AMMOC instructor duty has been a major constraint in the opportunity for course development. At the present time AMMOC

is authorized 20 instructors for the basic and short courses. However, only 16 instructors are currently assigned to AMMOC (Dalton, 1994). Current policy on maintenance officer assignments is that only volunteers are assigned to AMMOC unless instructor authorizations are designated as "must fill" by AETC. Once AETC has indicated the positions are "must fill," the remaining authorizations are filled to the current manning level of captain maintenance officers throughout the rest of the Air Force, which is presently around 95 percent. The Air Force Manpower and Personnel Center (AFMPC) is currently in the process of placing five nonvolunteers into the five vacant positions to completely fill AMMOC's twenty authorizations (Adkinson, 1994).

The issue arises as to whether an environment rich with nonvolunteers is healthy for an organization interested in high morale and quality training. This is particularly important because AFMPC's current practice is to select officers with at least fifteen years of service for the nonvolunteer assignments (Adkinson, 1994). This level of experience places nonvolunteers among the most senior of AMMOC instructors. As a result, nonvolunteers are more likely to assume the role of course supervisor.

Instead of relying on nonvolunteers, perhaps in the long run, it would be advantageous to make AMMOC a more attractive assignment for maintenance officers. We presented AMMOC's vision in Chapter II, part of which was to be "the 'place to be' for both instructors and students" (AMMOC, 1992). How to realize this vision is no simple dilemma. It is possible that impressing students with quality training would create a referent attitude among students towards AMMOC that would encourage their return as instructors. Furthermore, if AMMOC instructor duty were viewed as a good career opportunity, a likely result would be more volunteers for instructor duty. Consider the possibility of having more volunteers than could be accepted by the course. This would facilitate recruitment of the finest officers--a certain contribution to quality training. Unfortunately, the cycle must be started in some manner to attract volunteers.

5-8

Empowering instructors with additionally responsibilities and the necessary resources would be a start. In essence, satisfy the needs of the current instructors so that they begin marketing the benefits of AMMOC instructor duty. A complimentary short-term solution might be to offer prospective instructors some type of incentive such as their choice of a follow-on assignment. Such incentives were suggested during the first round of the Delphi procedure and received strong support among instructors in the second round.

Creating more time for course development is a complex issue which should be the subject of further study that considers all the relevant factors discussed above. The first step in solving this problem is determining AMMOC's true manpower requirements. The next step should be the evaluation of technical training and manpower policies to determine if they are consistent with AMMOC's requirements. If these policies are inconsistent with AMMOC's needs, the policies should be refined. According to Osborne and Gaebler, authors of *Reinventing government*, those who serve the customer are right next to the customer in terms of importance (1992: 172). If the Air Force agrees with Osborne and Gaebler's philosophy, technical training policies should support the needs of those who actually train.

Decentralization of Essential Training Support Activities

Three of the recommendations presented in Table 5-3 fall under the concept of decentralization and empowerment. They were to decentralize training manager and Training Development Element (TDE) activities to AMMOC, decentralize Evaluation activities to AMMOC, and provide AMMOC limited authority to implement changes to the CTS in the absence of U&TWs. Each is addressed in the following sections.

Training Manager and Training Development Element (TDE) Activities

As explained in Chapter II, the training manager is assigned to Training Plans, a staff function of the 362nd Training Squadron. The training manager constitutes a major link in

communications between AMMOC, its customers, and other components of training system such as the Air Force Career Field Manager (AFCFM), Major Command Functional Managers (MFMs), AFMPC, and Second Air Force (2AF). The training manager is also a focal point of the training system for critical activities affecting AMMOC such as student scheduling and Course Training Standard (CTS) development. Although student scheduling and CTS development are activities which significantly affect AMMOC, AMMOC lacks authority over them. This situation is not consistent with the Quality Air Force principle of "empowerment at the point of contact" introduced in Chapter I. By decentralizing responsibility for these activities to AMMOC, student scheduling, CTS development, and communications may be improved.

The benefits of decentralizing the training manager's activities to AMMOC are significant. Perhaps the greatest is the empowerment of AMMOC over essential activities and the elimination of a potential constraint in the communication process. Remember that AMMOC's training manager is not only responsible for AMO training, but also for training for the maintenance data systems analysis and the maintenance scheduling career fields. Decentralization of the training manager's activities to AMMOC will help facilitate a direct dialog between AMMOC, its customers, and other components of the training system, a dialog which will help assure that AMMOC's interests are effectively communicated to others.

As noted in Chapter II, infrequent Utilization and Training Workshops (U&TWs) are the forum for reviewing and updating the CTS. Responsiveness to customer needs necessitates continuous, effective communication between AMMOC and the AFCFM and MFMs. However, training managers within the 82nd Training Group do not routinely communicate with MFMs, nor do they normally pursue changes to the CTS outside of the U&TW process (Lawlor, 1994). Because of the infrequency of U&TWs and the apparent

5-10

policy of noncommunication with MFMs, communication between AMMOC and its customers is limited.

Given that the training manager's activities are decentralized to AMMOC, it is also logical to decentralize Training Development Element (TDE) activities to AMMOC. Recall from Chapter II that TDE is an intermediary between AMMOC and the training manager in the coordination and approval of some course control documents. This liaison would no longer be required. In fact, decentralization of TDE to AMMOC would eliminate yet another layer of the organization from the communications process.

Decentralizing the training manager's and TDE activities will help facilitate routine interaction between AMMOC, AFCFM, and MFMs. Such interaction should contribute to a more responsive training system. Figures 5-1 and 5-2 depict course development communications before and after decentralization of the training manager's activities to AMMOC.
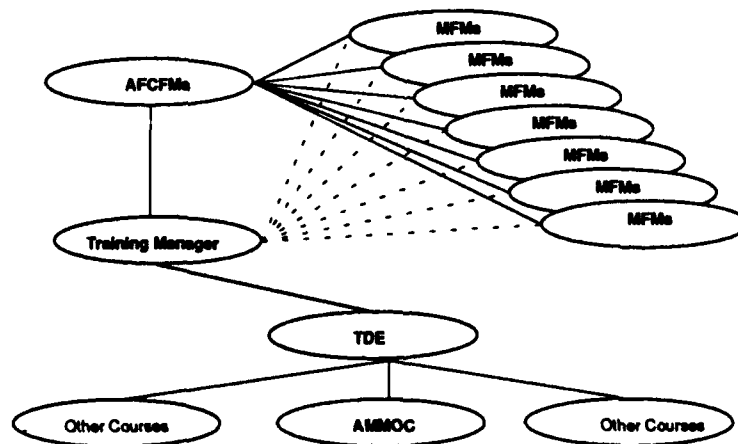
Figure 5-1. Model of Existing Communications System
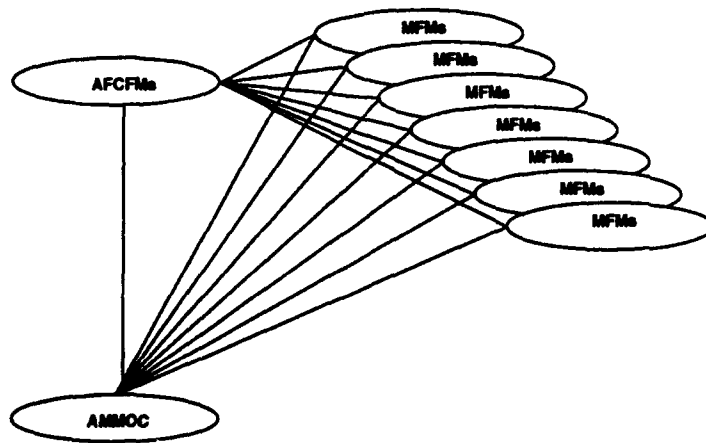
Figure 5-2. Model of Proposed Communications System

Decentralizing the training manager's activities also offers AMMOC the increased

influence over student scheduling. Student scheduling is important because it affects the

instructors' opportunities to engage in course development. Instructors contend that

because of the lean staffing of AMMOC instructors, and continuous back to back classes,

time for course development is at a premium. Creative scheduling of incoming classes

may afford instructors more time outside of the classroom for course development

activities. Figures 5-3 and 5-4 below depict the communications required for student

scheduling before and after decentralization of the training manager's activities to
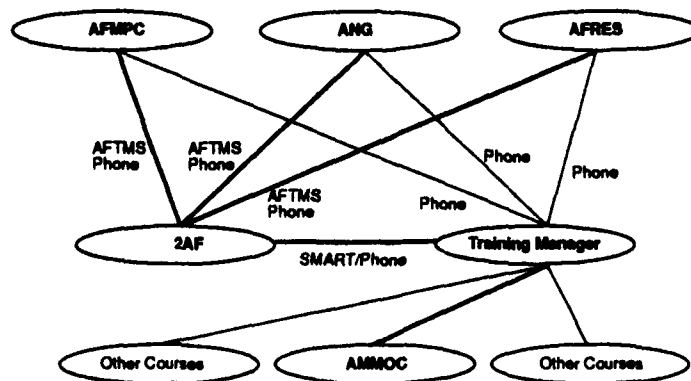
AMMOC.

Figure 5-3. Model of Current Scheduling System Communications
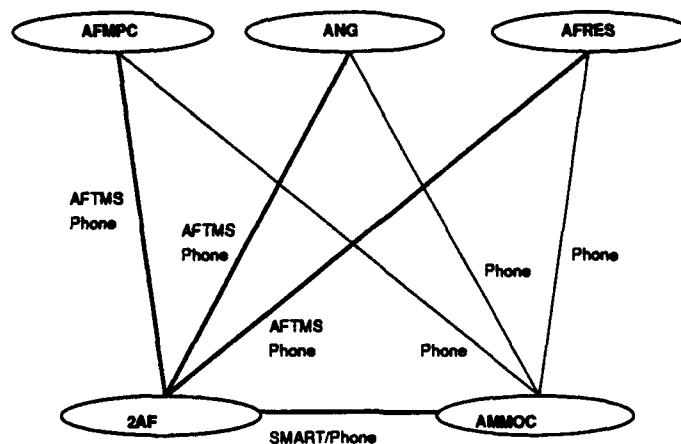
Figure 5-4. Model of Proposed Scheduling System Communications

<u>Decentralize Evaluation Activities to AMMOC</u>. Like Training Plans,

Evaluation is a focal point for essential activities that AMMOC relies upon. As a staff

function of the training group, Evaluation is the focal point for the collection of external

customer feedback for hundreds of courses, including AMMOC, which are assigned to the

82nd Training Group.

Recall that of the forms of customer feedback presented in Chapter II, none were

presenting AMMOC with significant feedback. The most recent significant feedback to

AMMOC was a 1991 Training Evaluation Report (TER) of AMMOC. Graduate

Assessment Surveys (GASs) which are administered to 100 percent of all enlisted training

graduates are not utilized at all for AMMOC graduates. The Customer Support

Information Line (CSIL), a feedback mechanism for customers in the field, is unadvertised

to AMMOC graduates and is manned by a single agency tasked with supporting literally

hundreds of other courses administered by the 82nd Training Group. With the exception

of the end-of-course student critiques, and infrequent U&TWs, it appears that AMMOC is

operating without customer feedback.

With the assistance of TQA, AMMOC should be empowered to design and administer its own program for soliciting continuous feedback from customers. Decentralizing the collection of feedback to AMMOC would eliminate an echelon of the organization from the feedback process and could help strengthen ties with the customer. Because AMMOC's program would be concerned with only AMMOC's customers, as opposed to the customers of every course in the training group, AMMOC's feedback program would likely achieve a higher degree of customer focus.

Provide Limited Authority to Implement Changes to the CTS. The last decentralization recommendation is to provide AMMOC limited authority to implement changes to the CTS in the absence of U&TWs. AMMOC instructors indicated their lack of authority to modify the CTS adversely affects the responsiveness of the training system. Because changes to the CTS are not normally pursued outside of the U&TW forum, and because U&TWs are relatively infrequent (seven years between that last two), it is possible for AMMOC to become bound to a CTS which is actually inconsistent with real training needs. If the CTS is to accurately reflect the needs of the customers, it must be a "living document" which is continually subject to review and improvement. AMMOC instructors contend that the curriculum development process could be improved and the training system could become more responsive if AMMOC instructors were provided authority to modify the CTS when changes in maintenance policies and practices in the field warrant such changes.

The new ISD model emphasizes that ISD is a continuous process of improvement. An important question is, does limiting CTS development to U&TWs contribute to continuous improvement? The most recent U&TW held in July 1994 suggests that it does not. The 1994 U&TW was the first in seven years. During this workshop, the participants agreed to drastic revisions in course length and curriculum content (Broardt, 1994). While this change is welcome, it also provides evidence of the nonresponsiveness

of this system during the periods between U&TWs. Instead of continuous incremental changes that are encouraged by QAF philosophies, the systems responds with large intermittent adjustments. This particular adjustment is so drastic that a full year will elapse before the new changes are implemented into the course (Broardt, 1994).

The researchers acknowledge that the CTS is a "contract" between customers and AMMOC, and do not advocate AMMOC's management of the CTS in the absence of customer oversight. Furthermore, it is evident from the second round Delphi responses that AMMOC instructors think that the CTS should be developed with the involvement of maintenance managers from operational units and major command staffs. The CTS could become more responsive to customer needs by providing AMMOC instructors authority to modify the CTS with inputs of managers from the field and the oversight of the AFCFM and MFMs.

A scheme for achieving this would be to allow AMMOC to implement proposed CTS changes prior to review and approval of the AFCFM and MFMs. In cases where the proposed changes are disapproved by the AFCFM and MFMs, AMMOC could immediately reverse them. We suspect that the vast majority of AMMOC's proposals would be approved. This is supported by the fact that CTS changes recommended by AMMOC instructors were accepted almost without exception during the 1994 U&TW (Broardt, 1994). Such a system could be viable given that training manager's activities are decentralized to AMMOC as recommended above. The likely result of this system would be a far more dynamic curriculum development process that would be more responsive to the customers' training needs.

Communications

From the first round of the Delphi procedure, we concluded that communications between AMMOC, its customers, and others involved in the training system are

ineffective. Many instructors contend that this condition leads to AMMOC's isolation from the operational world, which in turn leads to outdated instruction. In some cases, according to AMMOC instructors, it is students who inform the instructors of the latest policies in the field. Three recommendations were suggested and supported by AMMOC instructors for improving communications between AMMOC and the field. They were to have HQ USAF and major commands include AMMOC in message traffic concerning maintenance policies and practices, authorize and fund instructor TDYs to operational wings, and provide AMMOC direct access to E-mail. Each is discussed in the following sections.

Include AMMOC in Pertinent Message Traffic. Much of AMMOC's curriculum is related to maintenance policy and practices. Unfortunately, according to instructors, AMMOC is often not included in correspondence involving impending changes in policies. As a result, AMMOC becomes alerted to such changes through informal channels, or after changes have been incorporated into practice. This situation places AMMOC in a reactionary mode. According to one AMMOC instructor, "the credibility of instructors is challenged when we brief policies that are no longer in effect or talk about how great changes are working when in reality it is garbage." By including AMMOC as an informational addressee, AMMOC could become aware of impending policy changes and incorporate them into lesson plans prior to their taking effect. This would not only improve the responsiveness of training system, but would contribute to AMMOC's vision of "be[ing] on the leading edge and [being] recognized as the authority in the aircraft maintenance and munitions management field" (AMMOC, 1992).

Authorize and Fund Instructor TDYs. Instructors believe that TDYs to operational wings would help keep instructors abreast of current policies and practices in the field. Furthermore, such visits to the field should contribute to a stronger rapport between AMMOC and its customers.

<u>Provide Direct Access to E-mail</u>. E-mail can provide AMMOC direct contact with its customers and others involved in AMO training throughout the world. E-mail offers advantages over normal telephone service. First, it is unnecessary for both parties to be available simultaneously to communicate. This feature is important because most AMMOC instructors are unavailable except at lunch, before the beginning of the duty day, and after the end of duty day. These are times when those with whom instructors wish to communicate are often unavailable.

Consider the opportunities available to AMMOC if they had E-mail. AMMOC could create a compilation of E-mail addresses of those maintenance officers who have E-mail access and are interested in influencing the direction AMMOC is taking. E-mail could serve as a continuous source of customer feedback. When AMMOC has an issue to resolve, it could present the issue to AMOs in the field, and get practically instantaneous feedback from a cross-section of officers around the world. E-mail would serve as a type of Customer Service Information Line (CSIL) that is directly accessible to AMMOC as opposed to the current CSIL which is centrally managed and unpublicized to AMOs.

A second advantage over normal telephone service is that E-mail would provide a medium through which potential instructional materials may be quickly and conveniently transmitted. The implications on course administration could be significant. If the recommendation presented in this thesis to provide limited authority to AMMOC to implement changes to the CTS were accepted, E-mail could provide the means for the final approval of such changes. With all the appropriate players on line, the U&TW process could be a *continuous* process. The merits of E-mail are overwhelming.

Student Instructional Materials

The last specific improvement recommendation is to review AMMOC's needs for student instructional materials and fund the requirements accordingly. One hundred

percent of instructors agreed that funding is inadequate for student instructional materials such as study guides and student handouts. We assume that the resources dedicated to developing and administering training are intended to culminate in the actual training of students. Carl Albrecht, author of *Service within*, would likely describe the actual delivery of training as a "moment of truth." "Moments of truth" are the critical times when those who serve the customer either succeed or fail. All the time and effort dedicated to training development is essentially wasted if at the "moment of truth" you are unprepared to serve. AMMOC's needs for instructional material should be reviewed, and legitimate requirements for instructional materials should be funded.

Quality Air Force Revisited

Recall from Chapter I the Air Force's emphasis on Quality Air Force (QAF). Not only is QAF important in AMMOC's effectiveness, but AMMOC plays an important role in the proliferation of QAF principles throughout the Air Force. If QAF is a philosophy that is to permeate all levels of the Air Force, it must be instilled in our officers from the beginnings of their careers, during training. QAF values instilled in our AMOs are carried forth to aircraft maintenance organizations in the field where the QAF philosophies may be further spread to others throughout the Air Force. However, it is unlikely that QAF principles can be instilled during training if the organization which trains the officers does not exemplify QAF.

QAF emphasizes "customer focus" and "empowerment at the point of contact." It is evident from the AMMOC instructors feedback that the present support and guidance provided to AMMOC is deficient in both areas. To achieve "customer focus" and "empowerment at the point of contact" requires decentralization of authority, and empowerment of AMMOC.

It is evident from the successes of aircraft maintenance organizations in the field that empowerment of AMOs has positive results. Virtually all aircraft maintenance organizations today are based on decentralized concepts that empower aircraft maintenance officers with the authority and resources to accomplish their missions. It is ironic that AMMOC instructors who are charged with training AMOs to lead and manage decentralized organizations are in fact members of centralized organizations.

Areas for Further Research

Manpower. We indicated earlier in this chapter that the manpower model and the appropriateness of the model for AMMOC should be evaluated. We hypothesize that the model does not adequately account for the breath of the AMMOC curriculum and the ensuing course development requirements in establishing the manpower authorizations. In any case, if the training manager and Evaluation functions are decentralized and AMMOC is given the authority to manage a portion of the CTS development process as recommended, the implications associated with the manpower requirements need to be evaluated.

Facilities. In the general issues section of the Delphi's second round, AMMOC instructors unanimously indicated that facilities should be improved. We did not specifically pursue the causes for this position. Commentary from the first and second round indicated that part of the problem was in the inadequacies of the heating and cooling system which leads to an ineffective learning environment. One of our first round validation participants also indicated that some training effectiveness and efficiency improvements could be obtained through a facilities upgrade--for example, an auditorium/lecture hall where mass briefings could be held when guest speakers are available. We believe it would be beneficial to pursue an improvement analysis of AMMOC's facilities.

AMMOC Evaluation. We indicated in Chapter IV, that AMMOC instructors seemed unaware of a systematic method of evaluating AMMOC's performance. Our methodology did not create a consensus on how these measurements might be improved nor what measurements should be used. Future research should focus on determining the appropriate measures for evaluating AMMOC's effectiveness and efficiency.

Application of this Research to Other Areas of Technical Training
Though we applied this research to AMMOC, we believe our methodology, findings, and recommendations can be applied to other technical training courses, most especially to other officer technical training courses. We also believe aspects of our methodology can be applied to AMMOC and other courses on an ongoing basis as a means for soliciting feedback from the training system's internal customers, the instructors. We are unaware of any existing formal means for soliciting feedback from the these valuable system resources.

Chapter Summary

The objective of this research was to identify opportunities to improve the support and guidance provided to the Aircraft Maintenance and Munitions Officers Course. The intent of this objective was to ultimately improve the product of the course by focusing on the internal training system processes supporting AMMOC. Five areas related to the guidance and support provided to AMMOC were identified as strong candidates for improvement initiatives. They were:

1. Customer Communications
2. Training System Internal Communications
3. Training System Adaptability
4. Course Development Policy
5. Student Scheduling Policy

Eight recommendations intended to improve the areas identified above were presented and discussed. The specific recommendations were to:

      1. Determine and satisfy AMMOC's true manpower requirements, and refine training development and manning policy if necessary.

      2. Decentralize Training Manager and Training Development Element (TDE) activities to AMMOC.

      3. Decentralize Training Quality Assessment activities to AMMOC.

      4. Provide AMMOC limited authority to implement changes to CTS in the absence of U&TWs.

      5. Include AMMOC in HQ USAF and major command message traffic concerning maintenance policies and practices.

      6. Authorize and fund instructor TDYs to operational wings.

      7. Provide AMMOC direct access to E-mail.

      8. Review AMMOC's needs for student instructional materials and fund them accordingly.

It is our hope that this thesis has provided valuable information and recommendations for the improvement of the Aircraft Maintenance and Munitions Officers Course. Unfortunately, we, the researchers cannot control the implementation of the recommendations provided. This is left to the training professionals. We hope we have provided sufficient justification and information to serve as a catalyst for change. After all, the world is changing and forcing us to train our maintenance officers as effectively and efficiently as possible so that they will be prepared to meet the challenges of the future as we pursue our vision of "Global Reach - Global Power."

Appendix A: Glossary of Acronyms

2AF	Second Air Force
AETC	Air Education and Training Command
AETCR	AETC Regulation
AFB	Air Force Base
AFCAT	Air Force Catalog
AFCFM	Air Force Career Field Manager
AFIT	Air Force Institute of Technology
AFMPC	Air Force Manpower and Personnel Center
AFR	Air Force Regulation
AFRES	Air Force Reserve
AFS	Air Force Specialty
AFSC	Air Force Specialty Code
AFTMS	Air Force Training Management System
AMMO	Aircraft Maintenance and Munitions Officer
AMMOC	Aircraft Maintenance and Munitions Officers Course
AMO	Aircraft Maintenance Officer
AMOC	Aircraft Maintenance Officers Course
AMU	Aircraft Maintenance Unit
ANG	Air National Guard
ATC	Air Training Command
BMW	Bombardment Wing
CAMS	Core Automated Maintenance System
CC	Commander or Course Chart
CDC	Career Development Course
CFETP	Career Field Education and Training Plan
CSIL	Customer Service Information Line
CTS	Course Training Standard

DCM	Deputy Commander for Maintenance
DOD	Department of Defense
DSN	Defense Switchboard Network
FEQ	Field Evaluation Questionnaire
GAS	Graduate Assessment Survey
HQ USAF	Headquarters United States Air Force
ISD	Instructional Systems Development
LGs	Logistics Commanders
MAJCOM	Major Command
MFM	Major Command Functional Manager
MOC	Maintenance Operations Center
MPC	Air Force Manpower and Personnel Center
MX	Maintenance
OIC	Officer in Charge
OSR	Occupational Survey Report
POC	Point of Contact
POI	Plan of Instruction
QAF	Quality Air Force
SATAF	Site Activation Task Force
SMART	Simulated Modeling for Allocation of Resources for Training
SME	Subject Matter Expert
SOS	Squadron Officers School
SQ	Squadron
TDB	Training Development Branch (Element)
TDE	Training Development Element (Branch)
TDY	Temporary Duty

TER	Training Evaluation Report
TG	Training Group
TPR	Trained Personnel Requirement
TQA	Training Quality Assessment
TQAP	Training Quality Assessment Program
TQM	Total Quality Management
TQR	Training Quality Report
U&TW	Utilization and Training Workshop
USAF	United States Air Force
WPAFB	Wright-Patterson Air Force Base

Appendix B: 82nd Training Group Coordination Letter

11 APR 1994

MEMORANDUM FOR   82nd Training Group Commander
620 9th Avenue Suite 1
Sheppard AFB, TX 76311-2334
ATTENTION: Colonel Loren Reno
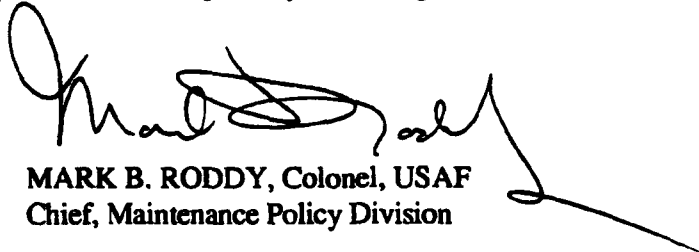
FROM: HQ USAF/LGMM
1030 Air Force Pentagon
Washington, DC 20330-1030

SUBJECT: Request for Research Support - ACTION MEMORANDUM

1. Captains Jeffrey T. Acred and James R. Witter, both graduate students at the Air Force Institute of Technology, are conducting research on Aircraft Maintenance Officer (AMO) training. The focus of their study is the training support infrastructure for the Aircraft Maintenance and Munitions Officers Course (AMMOC). An important part of their research involves obtaining the opinions of AMMOC instructors on how present Air Force and Air Education and Training Command (AETC) guidance and policy affect their ability to provide effective training. We are requesting your cooperation and support so that Captains Acred and Witter may work directly with the AMMOC instructor staff.

2. Captains Acred and Witter's research will have a negligible impact on your daily training operations. Most of their information can be obtained by telephone and through the mail. The data for this study will be generated by the Delphi method (atch 1) involving two iterations and, if necessary, a few interviews with selected members of your staff.

3. This research provides a unique opportunity for AMMOC personnel to voice their opinions on what resources, guidance, and authority should be given to AMMOC to produce well-trained aircraft maintenance officers. Their expertise may well contribute to future policy regarding AMO training, and possibly to policy regarding technical training in other disciplines. If desired, a summary of Captain Acred's and Captain Witter's research will be provided to you when it is completed in the Fall of 1994.

4. Your support of this research will be greatly appreciated. If you have any questions concerning this request, please contact either Captain Acred or Captain Witter at DSN 785-7777, extension 2405, or their thesis advisors, Dr. Guy Shane (extension 3347) or Lieutenant Colonel Rodney Rice (extension 3345).

5. Please indicate your approval or disapproval of this request by indorsing below.

MARK B. RODDY, Colonel, USAF
Chief, Maintenance Policy Division

Attachments:
1. Delphi Technique
2. Return Envelope

25 APR 1994

1st Ind, 82 TG/CC

TO: AFIT/LAA (Capt Acred/Witter)
    2950 P Street
    Wright-Patterson AFB, OH 45433-7765

Approve/~~Disapprove~~

LOREN M. RENO, Colonel, USAF
Commander, 82d Training Group

(This letter was electronically recreated and formatted to comply with the AFIT *Style Guide for Theses and Dissertations*)

Appendix C: Prequestionnaire Notification Letter

2 May 94

MEMORANDUM FOR 362 TS/RMA
527 G Avenue
Sheppard AFB, TX 76311-2835
ATTENTION: Capt Doe

FROM: AFIT/LAA
2950 P Street
Wright-Patterson AFB OH 45433-7765

SUBJECT: Request for Research Support - INFORMATION MEMORANDUM

1. As an expert in Aircraft Maintenance Officer (AMO) training, your help is needed in completing important research which is sponsored by Air Staff and supported by your group commander, Colonel Reno. The subject of our research is AMMOC support. We define support as the resources, guidance, and authority needed by AMMOC to accomplish its mission. It is our position that those who are tasked with the training of AMOs are the most qualified to identify opportunities to improve AMO training support.

2. In a few days, you will receive a Delphi questionnaire. Delphi is a technique for soliciting opinions and building consensus among experts. We will seek your expertise on a number of issues regarding AMMOC support that have been raised as areas for improvement by AMMOC instructors within the past two years. Ultimately, our goal is to solicit and present your ideas pertaining to AMO training to the Air Force in such a manner that it will benefit you.

3. We will present this thesis research to the Air Staff and Air Force Institute of Technology in partial fulfillment of the requirements for our master's degrees. The success of our research hinges on the accurate representation of your ideas. Therefore, your participation is vital. We greatly appreciate your cooperation.

SIGNED   SIGNED

JEFFREY T. ACRED, Capt, USAF   JAMES R. WITTER, Capt, USAF
Graduate Student, Air Force   Graduate Student, Air Force
  Institute of Technology   Institute of Technology

C-1

Appendix D: First-Round Questionnaire Cover Letter

6 May 1994

MEMORANDUM FOR   362 TS/RMA
                      527 G Avenue
                      Sheppard AFB, TX 76311-2835
                      ATTENTION: Capt Doe

FROM: HQ USAF/LGMM
         1030 Air Force Pentagon
         Washington, DC 20330-1030

SUBJECT: Training Support Questionnaire - ACTION MEMORANDUM

1. Headquarters USAF, Maintenance Policy Division, with the support of your group commander, is sponsoring research on the training support that is provided to AMMOC. Attached is a questionnaire to obtain your opinion as an aircraft maintenance officer training expert on how this training support can be improved. The questionnaire should require no more than a couple of hours. We encourage you to complete this questionnaire in a few short sessions instead of all at once.

2. This is the first of two questionnaires. The responses of all participants from this questionnaire will be combined in the second questionnaire for your assessment. You will receive the second questionnaire in approximately six weeks.

3. We realize that your participation in this research is purely voluntary and we appreciate your support. Because this research will be presented to Air Staff, it is possible that your opinions will have an impact on important decisions regarding future policy and guidance provided to AMMOC and to other providers of technical training. Please complete and return this questionnaire within two weeks.

4. If you have any questions regarding this questionnaire or this research, please call either Captain Acred or Captain Witter at DSN 785-7777, extension 2405.

SIGNED

MARK B. RODDY, Colonel, USAF
Chief, Maintenance Policy Division

D-1

Attachments:
1. Training Support Questionnaire
2. Return Envelope

(Original letter fit on one page. Format was changed to comply with the AFIT *Style Guide for Theses and Dissertations*)

AIRCRAFT MAINTENANCE OFFICER TRAINING SUPPORT QUESTIONNAIRE

FIRST-ROUND RESPONSE REQUEST

NOTE: ALL RESPONSES IN THIS QUESTIONNAIRE WILL REMAIN ANONYMOUS

PLEASE RETURN THIS QUESTIONNAIRE IN THE PROVIDED ENVELOPE BY:

20 MAY 1994

Aircraft Maintenance Officer (AMO) Training Support Questionnaire

The purpose of this questionnaire is to acquire your expert opinion concerning the support provided to the Aircraft Maintenance and Munitions Officers Course (AMMOC). This is an opportunity to express your opinions anonymously and to provide valuable feedback to HQ USAF, Air Education and Training Command, and your group. The topics addressed in this questionnaire were identified by AMMOC personnel during a Quality Improvement workshop conducted at Chanute AFB in September 1992. While your participation is purely voluntary, please realize that your input is vital to the successful completion of this worthwhile research.

Section A: Background

Please check the blocks in the following questions which apply to you.

1.   civilian _____   military _____

2. Years of instructor experience (Cumulative)

_____ none
_____ less than 2
_____ more than 2, but less than 4
_____ more than 4, but less than 6
_____ 6 or more

3. Years as an AMMOC Instructor

_____ none
_____ less than 2
_____ more than 2, but less than 4
_____ more than 4, but less than 6
_____ 6 or more

4. Excluding instructor time, years of experience as an aircraft maintenance officer

_____ none
_____ less than 2
_____ more than 2, but less than 4
_____ more than 4, but less than 6
_____ 6 or more

5. Excluding instructor time, years of experience as an aircraft maintenance technician

      _____ none
      _____ less than 2
      _____ more than 2, but less than 4
      _____ more than 4, but less than 6
      _____ 6 or more

6. Years of organizational/intermediate level maintenance experience (Include both managerial and technical experience. Do not include instructional tours)

      _____ none
      _____ less than 2
      _____ more than 2, but less than 4
      _____ more than 4, but less than 6
      _____ 6 or more

7. Years of depot level maintenance experience

      _____ none
      _____ less than 2
      _____ more than 2, but less than 4
      _____ more than 4, but less than 6
      _____ 6 or more

8. Years since you filled one of the positions in 6 or 7 above

      _____ not applicable (have not filled a position identified in questions 6 or 7)
      _____ less than 2
      _____ more than 2, but less than 4
      _____ more than 4, but less than 6
      _____ 6 or more

9. The Quality Air Force philosophy advocates six basic principles: Leadership Involvement, Dedication to Mission, Respect of the Individual, Decentralized Organization, Empowerment at the Point of Contact, and Management by Fact. Were you aware of these principles?

      _____ Yes   _____ No

10. In an effort to become more efficient and effective, DOD is encouraging, and in some cases directing, improved business practices. Were you aware of these initiatives?

      _____ Yes   _____ No

11. In 1992, a quality improvement workshop was conducted at Chanute AFB during which AMMOC personnel formulated mission and vision statements. Also identified were potential areas for improvement that were beyond the control of AMMOC. Were you a participant in this workshop?

_____ Yes   _____ No

Section B: General Quality Issues

1. CUSTOMER ORIENTATION.

      a. Who is AMMOC's primary customer?

      b. How does AMMOC communicate with its primary customer?

2. COMMUNICATIONS.

      a. In your opinion, how effective are the lines of communication between AMMOC and the various organizations (Operational MAJCOMs, MPC, AETC, Air Staff, etc.) involved in the system of training and training development?

      b. How can communications be improved?

3. ADAPTABILITY TO CHANGE

a. How responsive is the present system of training and training development to incorporating changes in maintenance and management concepts employed in the field?

b. How can this system become more responsive?

c. How flexible is the present system of training and training development to incorporating changes in maintenance and management concepts employed in the field?

d. How can this system become more flexible?

4. INSTRUCTOR PERFORMANCE EVALUATION

    a. How is the performance of individual instructors measured and evaluated?

    b. What are the strengths and weaknesses of these measures?

    c. How can AMMOC instructor performance evaluations be improved?

5. AMMOC PERFORMANCE EVALUATION.

    a. How is the performance of the AMMO Course measured and evaluated?

    b. What are the strengths and weaknesses of these measures?

    c. How should the AMMO Course be evaluated?

6. EMPOWERMENT

a. As an instructor, what authority should you have which you currently lack? Why should you have this authority (what advantage is gained)?

b. What restrictions or requirements have been placed on AMMOC as a whole, by regulations or any other guidance, that make training more difficult?

c. Can the constraints in 6b. above be removed without adversely affecting the quality of training?

Section C: Specific Quality Issues

1. CRITIQUE PROGRAM.

    a. What are the strengths and weaknesses of the student critique program?

    b. If you could improve the usefulness of the student critique program, what would you change, and how?

2. COURSE OBJECTIVE DEVELOPMENT.

a. What are the strengths and weaknesses of the current method of developing course objectives?

b. Do you know of a better method for developing course objectives?

3. COURSE CONTROL DOCUMENTS (Course Training Standards, Course Training Charts, and Plans of Instruction).

a. What are the strengths and weaknesses of course control documents?

b. If you could improve the usefulness of the course control documents by changing current regulations or guidance, what would you change, and how?

4. CLASS HOURS, TIME FOR RESEARCH AND COURSE ADMINISTRATION.

a. How do policies governing the minimum length of the training day affect the amount of time you have for research and course administration?

b. What do you think should be the policy on how instructors manage class time? Why?

c. What should be the minimum number of classroom hours per day? Should there be a standard training day?

5. SCHEDULING. What role, if any, should AMMOC play in the determination of class sizes, start dates, and graduation dates?

6. ADMINISTRATION. Are there administrative tasks imposed on AMMOC that can be streamlined or eliminated without adversely affecting training?

Section D: General Comments

1. What other ideas do you have for improving the support provided to AMMOC?

2. Any other comments.

Appendix F: Second-Round Questionnaire Cover Letter

20 June 94

MEMORANDUM FOR 362 TS/RMA
527 G Avenue
Sheppard AFB, TX 76311-2835
ATTENTION: Capt Doe

FROM: AFIT/LAA
2950 P Street
Wright-Patterson AFB OH 45433-7765

SUBJECT: Second Round Training Support Questionnaire

1. About one month ago, with the support of Air Staff and your group commander, all AMMOC instructors were asked to participate in a Delphi questionnaire procedure for improving the policy and guidance provided to AMMOC. Seventeen of nineteen instructors returned their questionnaires. We are very appreciative of your participation.

2. We are requesting that you complete the attached second round questionnaire. The purpose of the second round is to determine your level of agreement with the first round responses from the other AMMOC instructors. This round is multiple choice, and should require only about an hour to complete.

3. You will notice that a few sections from the first round are not included in this questionnaire. The answers on those questions were so strong we did not feel any additional clarification would be necessary. Areas of agreement included the fact that communications with external agencies may be improved significantly and that AMMOC should play a greater role in scheduling classes. To shorten this second round questionnaire, we combined similar first-round responses. Although your exact words may not be present, your basic ideas are represented..

4. We realize that your participation in this research is purely voluntary and we appreciate your support. Because this research will be presented to Air Staff, it is possible that your opinions will have an impact on important decisions regarding future policy and guidance provided to AMMOC and to other providers of technical training.

5. In advance, thank-you for participating in this second round. If you have any questions regarding this questionnaire or this research, please call either of us at DSN 785-7777, extension 2405.

SIGNED   SIGNED

JEFFREY T. ACRED, Capt, USAF   JAMES R. WITTER, Capt, USAF
Graduate Student, Air Force   Graduate Student, Air Force
   Institute of Technology   Institute of Technology

Attachments:
1. Second Round Training Support Questionnaire
2. Return Envelope

(Original letter fit on one page. Format was changed to comply with the AFIT *Style Guide for Theses and Dissertations*)

AIRCRAFT MAINTENANCE OFFICER TRAINING SUPPORT QUESTIONNAIRE

SECOND-ROUND RESPONSE REQUEST

NOTE: ALL RESPONSES IN THIS QUESTIONNAIRE WILL REMAIN ANONYMOUS

PLEASE RETURN THIS QUESTIONNAIRE IN THE PROVIDED ENVELOPE BY:

28 JUNE 1994

Aircraft Maintenance Officer (AMO) Training Support Questionnaire
Second Round

The purpose of this second questionnaire is to determine your level of agreement with the comments submitted by other respondents to the first round questionnaire on the support provided to the Aircraft Maintenance and Munitions Officers Course (AMMOC). Again, this is an opportunity to express your opinions anonymously and to provide valuable feedback to HQ USAF, Air Education and Training Command, and your group. This is the last round. If you have any additional thoughts, please feel free to add comments anywhere on the questionnaire. Reference a particular response if appropriate. While your participation is purely voluntary, please realize that your input is vital to the successful completion of this worthwhile research.

Section A: Background

Though you provided background information in the first round, please take a moment to check the blocks in the following questions which apply to you.

1.   civilian ___6___   military ___11___ .

2. Years of instructor experience (Cumulative)

    _____ none
    __6___ less than 2
    __5___ more than 2, but less than 4
    _____ more than 4, but less than 6
    __6___ 6 or more

3. Years as an AMMOC Instructor

    _____ none
    __9___ less than 2
    __5___ more than 2, but less than 4
    _____ more than 4, but less than 6
    __3___ 6 or more

4. Excluding instructor time, years of experience as an aircraft maintenance officer

    __6___ none
    _____ less than 2
    __2___ more than 2, but less than 4
    __2___ more than 4, but less than 6
    __7___ 6 or more

5. Excluding instructor time, years of experience as an aircraft maintenance technician

    __9__ none
    __1__ less than 2
    _____ more than 2, but less than 4
    __2__ more than 4, but less than 6
    __5__ 6 or more

6. Years of organizational/intermediate level maintenance experience (Include both managerial and technical experience. Do not include instructional tours)

    __2__ none
    _____ less than 2
    __3__ more than 2, but less than 4
    __5__ more than 4, but less than 6
    __7__ 6 or more

7. Years of depot level maintenance experience

    __15__ none
    _____ less than 2
    __1__ more than 2, but less than 4
    __1__ more than 4, but less than 6
    _____ 6 or more

8. Years since you filled one of the positions in 6 or 7 above

    __2__ not applicable (have not filled a position identified in questions 6 or 7)
    __3__ less than 2
    __6__ more than 2, but less than 4
    __2__ more than 4, but less than 6
    __4__ 6 or more

Section B: Quality Issues

	1. BARRIERS TO EFFECTIVE TRAINING: The first round responses indicate that the following are barriers to effective training. Please rate your agreement/disagreement with each. Additionally, please identify, by circling the letters in the left hand column, the ten barriers that you believe are the most significant. [7 No Responses]	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE	NO RESPONSE
A	Commanders (flight, squadron, group, and wing) have limited training background. [2 votes]	7	6	4		
B	Commanders (flight, squadron, group, and wing) have limited maintenance experience. [5 votes] [(Dis) SQ CC is limited, all others are MX types]	4	6	6		1
C	Restrictions on maximum class size and student throughput result in continuous back-to-back classes. [7 votes]	10	4	3		
D	Manning levels and back-to-back classes afford instructors inadequate time for conducting research and course development. [10 votes]	16	1			
E [1]	Officer and enlisted training are not distinguished from one another by present training policy. [2 votes]	5	5	4	2	1
E [2]	AMMOC's designation as technical training precludes general management training. [4 votes]	5	6	5		1
F	Course Training Standard (CTS) objectives do not support an underlying goal for AMMOC's training. [2 vote]	5	8	3		1
G	AMMOC lacks authority to modify the CTS. [6 votes]	5	8	2	1	1
H	Process for changing course length is difficult. [6 votes]	10	6	1		
I	AMMOC is not included on important message traffic pertaining to maintenance policies and practices. [5 votes]	12	4	1		

J	Utilization and Training Workshops (U&TW) are too infrequent. [3 votes]	6	5	5		1
K	Vaguely worded CTS objectives make it difficult to determine the intent of the CTS authors. [5 votes]	7	8	2		
L	AMMOC instructor staff lacks educational expertise in academics and training. [3 votes]	3	6	8		
M	AMMOC instructors are frequently pulled from the course to fill other positions in the group. [5 votes]	8	7	1	1	
N	There is no incentive to streamline training because any resources saved are taken away. [5 votes] [(Dis) I don't believe there is an incentive to change the course length, but I don't think this is the reason. I believe it is more to do with resistance to change.]	6	9	2		
O	Classes must remain in session, even after teaching objectives have been satisfied. [4 votes]	4	5	6	1	1
P	Senior management adds training requirements to AMMOC above and beyond what is called for in the CTS (i.e. brake changes). [2 votes] [(NR- question was double marked Agree & Disagree, interpreted as neutral or no response)] [(Strg Dis) CTS item "perform a maintenance task" is currently fulfilled by the MOC (Maintenance Operations Center) simulator. This item ("perform a maintenance task") would be fulfilled by a brake change.]	4	6	5	1	1
Q	Accessibility to current technology trainers is lacking. [3 votes]	7	6	2	1	1
R	There is insufficient funding for student instructional materials. [6 votes]	11	6			
S	AMMOC supervisory positions are staffed with personnel of insufficient rank. [2 votes]	3	4	8	2	

T	Approval for acceleration of students or instruction is difficult to obtain. As a result, such measures are usually not pursued. [2 votes]	6	8	2	1	
U	Proficiency advancement test failures are scored as block test failures. As a result, proficient students are hesitant to attempt proficiency advancement. [3 votes]	8	3	6		

COMMENTS: (Please refer to the item to which you are commenting; for example, 1.A.)

2. CUSTOMER ORIENTATION: The first round responses identified the individuals or organizations listed below as AMMOC's customers. Please rate your agreement/disagreement with each as a customer.	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE	NO RESPONSE
A AMMOC students	4	9	2	2	
B Supervisors of AMMOC graduates	11	6			
C Commanders of AMMOC graduates	12	5			
D MAJCOMs, Field Operating Agencies, or Direct Reporting Units to which AMMOC graduates are assigned	11	6			
E Foreign governments of international students	9	8			

3. FEEDBACK: According to AETCR 52-12, the following are means of obtaining feedback. Please indicate your opinion of how effective the present uses of these measures are for providing AMMOC with meaningful feedback.

		HIGHLY EFFECTIVE	EFFECTIVE	INEFFECTIVE	HIGHLY INEFFECTIVE	NO RESPONSE
A	Training Quality Reports (TQRs). [(NR) Never seen these. Who gets them?] [(Highly Ineff) Never seen one come back]		2	8	4	3
B	Field Evaluation Questionnaires/Training Evaluation Reports (TERs). [(NR) Never seen these. Who gets them?]		4	6	4	3
C	Customer Service Information Line (CSIL).		3	6	5	3
D	Field Interviews. [(Agree) Just started]	3	6	4	4	
E	Occupational Survey Reports [(Highly Ineff) Worthless] [(Highly Ineff) Stupid/a waste - In left field (Respondent indicated they had seen data from the most recent survey)]	1	2	7	5	2
F	Subject Matter Expert Feedback [(NR) Unknown to me]		6	6	2	3
G	Graduate Assessment Surveys. [(NR) Unknown to me]		8	5	3	1

COMMENTS: (Please refer to the item to which you are commenting; for example, 1.A.)

[3.A-G. Instructors here (at AMMOC) have never seen any of these!]

4. COMMUNICATIONS: The first round questionnaire demonstrated that the majority of AMMOC instructors regard communications with Air Staff, the major commands, and the field as relatively ineffective. Please rate your agreement/disagreement with each of the following improvement ideas submitted during the first round.

		STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE	NO RESPONSE
A	Provide AMMOC access to electronic-mail for correspondence with organizations throughout the Air Force.	8	8	1		
B	Permit and fund instructor TDYs to operational wings to maintain AMMOC's currency with field operations and policies.	13	4			
C	Place AMMOC on distribution for changes in policies and regulations.	14	3			
D	Include AMMOC in pertinent message traffic for informational purposes to maintain AMMOC's currency on unit level maintenance policies and practices.	13	3	1		
E	Establish points of contact within MAJCOMs, research centers and depots. These points of contact could forward information to AMMOC.	11	5	1		
F	Have instructors aggressively follow-up with operational units to find out how the students' time at AMMOC prepared them for their assignments.	6	7	3	1	
G	Have instructors conduct field evaluations of AMMOC graduates.	6	7	3	1	
H	Conduct surveys of former students and commanders.	6	9	2		
I	Provide a system through which the various organizations may provide inputs or suggestions pertaining to AMMOC's training on an ongoing basis, not only at a U&TW conference.	10	5	2		
J	Implement a guest speaker program featuring speakers with a variety of backgrounds. This will expose instructors to current policies and practices.	8	5	2	1	1

5. ADAPTABILITY TO CHANGE: The first round questionnaire demonstrated that the majority of AMMOC instructors regard the present system of training development as relatively inflexible and nonresponsive. The following two sections address opportunities for improving the responsiveness and flexibility of training.

a. During round one, AMMOC instructors suggested the following measures for improving the flexibility [*] of training. Please rate your level of agreement/disagreement with each.

[* "flexibility" should have read "responsiveness." See page 4-12 of the thesis for explanation.]

		STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE	NO RESPONSE
A	Allow instructors to go TDY and then update lesson plans.	12	4			1
B	Provide instructors time to conduct course development. [(Strg Agree) We need to do either B or C.]	15	2			
C	Establish a cadre of personnel for course development to relieve instructors of the burden of both developing and providing training. [(Strg Agree) We need to do either B or C.]	7	8	2		
D	Shorten instructor tour lengths to maintain an instructor staff with recent experience. [(Dis) 3 yrs is O.K.-if you can keep them in AMMOC] [(Dis) Shorter tour lengths would require a constant flow of getting people qualified and then only getting a year or so of work before going through the same process all over again. It takes 8-10 months to get an instructor on their own in the classroom.]	4	6	6	1	
E	Distinguish course development policies for officer courses from those for enlisted courses. [(Strg Dis) What? We use (enlisted course) CDCs to develop our courses. Why is this question asked?]	4	9	2	1	1

F	Establish MAJCOM and Air Staff points of contact for AMMOC which include office symbols, names and telephone numbers.	7	8	2		
G	Empower AMMOC staff to change the Course Training Standard (CTS) when changes in maintenance policies and practices warrant it.	6	8	2	1	
H	Send MAJCOM and/or Air Staff to AMMOC periodically to evaluate appropriateness of its curriculum.	7	4	6		
I	Include AMMOC in pertinent message traffic for informational purposes to maintain AMMOC's currency on unit level maintenance policies and practices.	11	6			
J	Improve communication between AMMOC, and USAF and MAJCOMs regarding impending changes to maintenance policies and practices.	11	6			

	b. During round one, AMMOC instructors suggested the following as measures for improving the **flexibility** of training. Please rate your level of agreement/disagreement with each.	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE	NO RESPONSE
A	Implement mission-oriented management philosophies which embrace principles such as empowerment and decentralization.	5	10	1		1
B	Send instructors TDY to operational units to increase their awareness of current policies and practices.	11	6			
C	Distinguish course development responsibilities between AMMOC instructors and Training Development Element (TDE) personnel.	8	7	1		1
D	Give instructors inputs on planning course schedules, class sizes, and down times.	12	5			
E	Include AMMOC in pertinent message traffic for informational purposes to maintain AMMOC's currency on unit level maintenance policies and practices.	12	4	1		

COMMENTS: (Please refer to the item to which you are commenting; for example, 1.A.)

[5.b.B & D (Stng Agree) We have a lot of outstanding, common sense maintenance officers here who want to do a great job but have their hands tied. Allowing us to keep current with field operating (5.b.B) and the time to develop quality courses (5.b.D) will only improve this course overall. The credibility of instructors is challenged when we brief policies that are no longer in effect or talk about how great changes are working when in reality it is all garbage. Communications between the field both in person and written is the key.]

6. INSTRUCTOR PERFORMANCE EVALUATION:

The responses from the first round demonstrated that instructor performance is evaluated primarily with the AETC Form 281, in addition to some other informal means such as student performance. During the first round, the following ideas were suggested for improving the methods for evaluating instructor performance. Please rate your agreement/disagreement with these ideas.

		STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE	NO RESPONSE
A	AETC Form 281 should place more emphasis on lesson content than instructor presentations skills.	2	5	8	1	1
B	Implement a more descriptive AETC Form 281 giving more specific expectations of performance.	3	11	3		
C	Ensure instructors are evaluated by personnel who possess both subject matter and training/education expertise. [(Dis) Impossible]	7	6	4		
D	Conduct evaluations more frequently to obtain a more representative measurement of instructor performance.	1	8	6	2	
E	Have a variety of experts evaluate each instructor to improve quality of feedback.	4	7	5	1	
F	Conduct informal evaluations in addition to formal evaluations.	3	11	2		1
G	If student test scores are to serve as a measure of instructor performance use random computer generated tests to prevent "teaching the test." [(Agree) Grades should not be used as an instructor's performance measurement tool.]	3	9	4	1	
H	Base instructor performance on student performance as measured by randomly generated pretests and post tests. [(Dis) Yes - Random test generation is a good idea.]	3	6	6	1	1

I	Increase student involvement in instructor performance evaluations. [(Dis) How?]	2	4	6	5	

COMMENTS: (Please refer to the item to which you are commenting; for example, 1.A.)

[A good assessment program **must** include   1. Supervisor Assessment
                                                             2. Peer Assessment
                                                             3. Self Assessment]

7. AMMOC PERFORMANCE EVALUATION: From the first round responses, it is evident that there is little awareness of any systematic method for evaluating AMMOC's overall performance. AMMOC instructors offered the following as methods for improving AMMOC performance measures.	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE	NO RESPONSE
A Get an evaluation "expert" to develop an evaluation plan. [(Strg Agree) We have the "experts" on the staff, we just need to have leadership recognize & embrace that expertise.]	3	11	1	1	1
B Administer a pretest and cumulative final exam at the end of the course as a measure of effectiveness. [(Dis) Block 9 serves as a cumulative test if administered properly.]	8	4	4		1
C Improve field surveys to provide more useful information to AMMOC.	5	10	2		
D Have maintenance officers, as opposed to personnel with no background in aircraft maintenance, conduct field surveys of AMMOC graduates.	7	8	1		1
E Annual questionnaire to field commanders about how our students are doing and what we can do to help them out.	7	8	1		1
F Evaluate graduates' job performance in the field. [(Strg Dis) Eval. knowledge]	5	9	2	1	

COMMENTS: (Please refer to the item to which you are commenting; for example, 1.A.)

[7.C (Dis) & 7.D (Agree) These survey rarely work. They are more a nuisance to supervisors and commanders in the field than anything else. This is just square filling and offers little good information.]

8. CRITIQUE PROGRAM: During round one, the following were suggested as means of improving the critique program. Please rate your agreement/disagreement with each.

		STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE	NO RESPONSE
A	Limit review process of student critiques to the instructor supervisor level. [(Dis) Limit to Flight Commander level]	3	6	4	3	1
B	Establish a requirement for AMMOC to reply to all student critiques regardless of whether students so request.	4	1	10	2	
C	Do not make student critiques mandatory.	4	9	3	1	
D	Have students discuss their critiques with each instructor prior to graduation.	4	9	3		1
E	Conduct group reviews of student critiques with AMMOC instructor staff to help determine core problems and devise solutions.	5	9	3		
F	Change attitude of management to listen and be receptive to new ideas, even if they come from students. [(Agree) We do listen] [(Strg Dis) Flt level mgt attitude excellent & receptive]	6	10		1	
G	Corrective actions to deficiencies noted in student critiques should be coordinated with the instructor staff.	4	13			
H	Follow up on corrective actions implemented as result of student critiques.	4	13			
I	Ensure end of course critiques are provided to instructors being critiqued.	11	6			

J	Delay course critiques for a period of one year after graduation.	2	3	8	4		
	[(Agree) Do both] [(Agree) One year might be a little long. 6-8 months probably better.] [(Dis) Critique at end of course plus one year after grad. -Sometimes students don't realize the benefit of AMMOC until they have been out there a while!]						

COMMENTS: (Please refer to the item to which you are commenting; for example, 1.A.)

9. COURSE OBJECTIVE DEVELOPMENT

a. During round one, AMMOC instructors identified the following as strengths and weaknesses with the course objective development process. Please rate your agreement or disagreement with those presented below.

		STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE	NO RESPONSE
	Strengths					
A	Course objectives are very precise, orderly, and clearly defined. [(Strg Dis) Our objectives are extremely vague and the process of changing the course is very cumbersome.]	1	8	4	4	
B	Once changes are made to the objectives, the course responds with course updates relatively quickly. [(Dis) Our objectives are extremely vague and the process of changing the course is very cumbersome.]	1	5	10	1	
	Weaknesses					
C	There are no real management/performance objectives. Our course objectives only require students to identify facts. This is the lowest level of the cognitive domain.	10	5	2		
D	Objectives are developed at U&TW meetings by senior maintenance personnel from the MAJCOMs and Air Staff, not maintenance officers from the field. [(Strg Dis) We develop objectives] [(Strg Dis) Objectives are not developed at U&TW, only behavior statements] [(Dis) disagree as a weakness, not the statement itself.]	7	4	4	2	
E	Old CTS is often used as a building block for new CTS. This methodology does not lend itself to significant changes.	9	5	3		
F	Course objectives devised from U&TW are vague. For example, an objective that reads "Identify facts about electricity" could be interpreted numerous ways. [(NR) Objectives are not developed at U&TW, only behavior statements]	9	7			1

G	Course objectives rarely change.	6	8	3		
H	It is difficult to determine the intentions of the CTS writers. For example, a CTS element may say, "Identify facts about..." What kind of facts do they want taught?	11	4	2		
I	CTS development lags changes in the field.	12	4	1		

COMMENTS: (Please refer to the item to which you are commenting; for example, 1.A.)

b. During round one, AMMOC instructors suggested the following as improvements to the course objective development process. Please rate your agreement or disagreement with each of them.	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE	NO RESPONSE
A Develop an "on-line" system for developing and maintaining course objectives that is accessible by AMMOC, Air Staff, and the major commands. [(Strg Agree) (Respondent lined out objectives and wrote goals)]	8	7	1		1
B AMMOC should be empowered to develop its own course objectives with the oversight of MAJCOMs and Air Staff.	9	5	3		
C AMMOC should be empowered to develop course objectives, and represent the various MAJCOMs in the process.	4	6	5	1	1
D Course objectives should support an overall plan for maintenance officer training, and should not exist as a list of independent subjects.	9	7			1
E Course objectives should be developed with the involvement of maintenance leaders from operational units and MAJCOM staffs who range from company to field-grade ranks. The development process should include a review of current AMMOC lesson plans.	9	5	3		
F Each CTS element should have a short narrative statement outlining what aspects of the topic should be taught. This will convey the authors' intents pertaining to each CTS element.	9	7			1

COMMENTS: (Please refer to the item to which you are commenting; for example, 1.A.)

[9.b.E & 9.b.F These are the solutions to AMMOC. I've spoken to LGs who disagree with material taught in AMMOC. They have not ever been included in (occupational measurement) surveys. Why? Overhaul needed]

10. COURSE CONTROL DOCUMENTS (Course Training Standards, Course Training Charts, and Plans of Instruction).

a. During round one, AMMOC instructors identified the following as strengths and weaknesses of course control documents. Please rate your agreement or disagreement with those presented below.

		STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE	NO RESPONSE
	Strengths					
A	Course training charts provide a fast overview of the course and total training time.	6	10	1		
B	Course charts show the flow of the overall course from one block to the next.	2	12	2	1	
C	The POI is the most useful document for the instructor because it provides the most insight into the training itself.		9	6	2	
D	Course control document formats serve the purpose of standardizing training.		14	2	1	
	Weaknesses					
E	There are too many course control documents.		6	10		1
F	Course control documents quickly become outdated.	6	10	1		
G	Course control documents require too much time to keep current.	2	8	4	1	2
H	CTS, course charts and POI part 1 do not provide useful guidance.	3	6	7	1	
I	Obtaining permission to modify course charts and POI part 1 is difficult. [(Strg Dis) Our TDB is very efficient in our needs]	5	9	2	1	
J	Lesson plans (POIs part 2) are only as good as the responsible instructor makes them; they are the sole users in most cases.	11	5	1		

K	POIs are full of "facts" and "technical" information obtained from regulations and technical orders which have minimal relevance to the development of managers. [(Strg Dis) True, they contain a lot of T.O. and regulation info but a primary job of managers is to enforce compliance. How can you do that if you do not know the standards? On the other hand, AMMOC should teach more "real-life" management scenarios. Spend about an hour a day in class throwing out different scenarios dealing with people or planning etc. and let the students discuss them. The majority of the (students) do not even realize they will encounter situations like these in the field. In this respect, we are doing our students a disservice by giving them all sorts of technical info and no ways to apply it to real situations. 90% of our job is people!!]	7	4	4	1	1
L	POIs are rarely reviewed for appropriateness and applicability to mission goals.	5	7	5		
M	The instructional guidance for lesson plans is a product of the instructor's "interpretation" of CTS elements rather than a concrete statement of training desires.	7	5	4		1

COMMENTS: (Please refer to the item to which you are commenting; for example, 1.A.)

	b. During round one, AMMOC instructors suggested the following as improvements to course control documents. Please rate your agreement or disagreement with those presented below.	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE	NO RESPONSE
A	Condense factual information in POIs into workbooks that can be completed at home base with no loss of quality.	3	7	4	1	2
B	Streamline course control documents. [(Strg Agree-respondent inserted "the process for developing" after "Streamline")]	3	9	4		1
C	Allow AMMOC to modify course control documents.	5	8	4		
D	Scrap the current CTS and start from scratch--do not try to "mend" the current CTS.	8	6	3		
E	Give instructors the time or AMMOC the manning to properly develop the course chart and POIs.	13	4			
F	Make objectives clear and concise.	11	6			
G	Make it easier for instructors to rearrange objectives within a block and even move objectives from one block to another if it would help improve training. [(Agree) So far our supervision has allowed movement of objectives without interference.] [(Dis) Has been done, can be done easy.] [(Strg Agree) It's easy to do!] [(Agree) I feel that TDB does this already when necessary]	10	6	1		

COMMENTS: (Please refer to the item to which you are commenting; for example, 1.A.)

11. GENERAL ISSUES: Presented below are general ideas suggested during the first round. Please rate your agreement/disagreement with each.	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE	NO RESPONSE
A Maintenance officers should be offered an incentive to become AMMOC instructors (i.e. choice of follow-on assignment).	10	6	1		
B AMMOC's name should be changed to establish a new reputation.	4	4	7	2	
C A logistics university should be created that encompasses all support officer career fields. This university would focus not only on teaching, but also on research and development of logistics processes and management techniques.	7	4	5	1	
D Facilities should be improved.	10	7			
E Officer training should be separated from enlisted training. This would prevent AMMOC students from being treated like "airman basics" by the squadron and other base agencies. [(Strg Dis) Use more enlisted courses and enlisted MSgt & SMSgts to teach AMMOC. (If we'll get more technical)]	5	8	3	1	
F AMMOC should not be designated as technical training. [(Agree) AMMOC is not a technical training course]	3	10	3		1
G AMMOC curriculum should be refocused to emphasize management (i.e. problem solving, decision making, etc.).	6	7	3		1

H	Make AMMOC a seminar course without block tests. [(Strg Dis) I do not think this is a good idea because the younger people we work with are not always dedicated enough to perform in a seminar like the senior officers course. Test are still a good idea to have.] [(Dis) There are areas we could teach by seminar, however; not all areas should be. Some traditional instruction, individual projects, seminars/guest speakers, simulators/exercises, hands-on, and tours would round out AMMOC well.] [(Strg Dis) Seminar with block test]	1	2	9	4	1
I	Add authorizations for select personnel with advanced academic degrees in education and training disciplines. [(Dis) What we need is fewer homesteaders and more people with more than one assignment in the field to come here and teach real-life. Advanced degrees do not make experts they make people who know the principles (but) have very little experience in applying them.] [(Dis) (We have) open (authorizations)]	3	7	5	1	1
J	Establish library/research area for students and staff. [(Dis) Give (us) time (for research)]	6	8	2		1
K	Establish authorizations within AMMOC for a select number of higher ranking officers (i.e. majors/lieutenant colonels) for supervisory and instructor duty. [(Dis) Give (us) more time/material] [(Strg Agree) Not just higher rank, but people with more experience than 1 base, 1 aircraft (Someone with state side and overseas time) so they understand the different areas. Make AMMOC Staff positions.]	5	5	5	2	
L	Institute job related exercises pertaining to topics such as mobility and battle staffs.	10	5		1	1
M	Utilize officers assigned to AMMOC as instructors or course developers instead of employing them in other positions in the group.	9	4	3		1

N	Formally include AMMOC instructors in the feedback process for training policy and course development.	8	9			
O	Bring AMMOC more in line with Quality Air Force (QAF) practices.	7	8		1	1

COMMENTS: (Please refer to the item to which you are commenting; for example, 1.A.)

Appendix H: Second-Round Statistics

Question	Strongly Agree (4)	Agree (3)	Disagree (2)	Strongly Disagree (1)	No Resp.	Average	Std Dev	Percent "Agree"	Percent "Strong"
1. A	7	6	4			3.18	0.78	76	41
B	4	6	6		1	2.88	0.78	59	24
C	10	4	3			3.41	0.77	82	59
D	16	1				3.94	0.24	100	94
E1	5	5	4	2	1	2.81	1.01	59	41
E2	5	6	5		1	3.00	0.79	65	29
F	5	8	3		1	3.13	0.70	76	29
G	5	8	2	1	1	3.06	0.83	76	35
H	10	6	1			3.53	0.61	94	59
I	12	4	1			3.65	0.59	94	71
J	6	5	5		1	3.06	0.83	65	35
K	7	8	2			3.29	0.67	88	41
L	3	6	8			2.71	0.75	53	18
M	8	7	1	1		3.29	0.82	88	53
N	6	9	2			3.24	0.64	88	35
O	4	5	6	1	1	2.75	0.90	53	29
P	4	6	5	1	1	2.81	0.88	59	29
Q	7	6	2	1	1	3.19	0.88	76	47
R	11	6				3.65	0.48	100	65
S	3	4	8	2		2.47	0.92	41	29
T	6	8	2	1		3.12	0.83	82	41
U	8	3	6			3.12	0.90	65	47
2. A	4	9	2	2		2.88	0.90	76	35
B	11	6				3.65	0.48	100	65
C	12	5				3.71	0.46	100	71
D	11	6				3.65	0.48	100	65
E	9	8				3.53	0.50	100	53

Question	Highly Effective (4)	Effective (3)	Ineffect. (2)	Highly Ineffect. (1)	No Resp.	Average	Std Dev	Percent Rated Effective	Percent "Highly"
3. A		2	8	4	3	1.86	0.64	12	24
B		4	6	4	3	2.00	0.76	24	24
C		3	6	5	3	1.86	0.74	18	29
D	3	6	4	4		2.47	1.04	53	41
E	1	2	7	5	2	1.93	0.85	18	35
F		6	6	2	3	2.29	0.70	35	12
G		8	5	3	1	2.31	0.77	47	18

H-1

Question	Strongly Agree (4)	Agree (3)	Disagree (2)	Strongly Disagree (1)	No Resp.	Average	Std Dev	Percent "Agree"	Percent "Strong"
4. A	8	8	1			3.41	0.60	94	47
B	13	4				3.76	0.42	100	76
C	14	3				3.82	0.38	100	82
D	13	3	1			3.71	0.57	94	76
E	11	5	1			3.59	0.60	94	65
F	6	7	3	1		3.06	0.87	76	41
G	6	7	3	1		3.06	0.87	76	41
H	6	9	2			3.24	0.64	88	35
I	10	5	2			3.47	0.70	88	59
J	8	5	2	1	1	3.25	0.90	76	53
5a. A	12	4			1	3.75	0.43	94	71
B	15	2				3.88	0.32	100	88
C	7	8	2			3.29	0.67	88	41
D	4	6	6	1		2.76	0.88	59	29
E	4	9	2	1	1	3.00	0.79	76	29
F	7	8	2			3.29	0.67	88	41
G	6	8	2	1		3.12	0.83	82	41
H	7	4	6			3.06	0.87	65	41
I	11	6				3.65	0.48	100	65
J	11	6				3.65	0.48	100	65
5b. A	5	10	1		1	3.25	0.56	88	29
B	11	6				3.65	0.48	100	65
C	8	7	1		1	3.44	0.61	88	47
D	12	5				3.71	0.46	100	71
E	12	4	1			3.65	0.59	94	71
6. A	2	5	8	1	1	2.50	0.79	41	18
B	3	11	3			3.00	0.59	82	18
C	7	6	4			3.18	0.78	76	41
D	1	8	6	2		2.47	0.78	53	18
E	4	7	5	1		2.82	0.86	65	29
F	3	11	2		1	3.06	0.56	82	18
G	3	9	4	1		2.82	0.78	71	2
H	3	6	6	1	1	2.69	0.85	53	24
I	2	4	6	5		2.18	0.98	35	41
7. A	3	11	1	1	1	3.00	0.71	82	24
B	8	4	4		1	3.25	0.83	71	47
C	5	10	2			3.18	0.62	88	29
D	7	8	1		1	3.38	0.60	88	41
E	7	8	1		1	3.38	0.60	88	41
F	5	9	2	1		3.06	0.80	82	35

Question	Strongly Agree (4)	Agree (3)	Disagree (2)	Strongly Disagree (1)	No Resp.	Average	Std Dev	Percent "Agree"	Percent "Strong"
8. A	3	6	4	3	1	2.56	1.00	53	35
B	4	1	10	2		2.41	0.97	29	35
C	4	9	3	1		2.94	0.80	76	29
D	4	9	3		1	3.06	0.66	76	24
E	5	9	3			3.12	0.68	82	29
F	6	10		1		3.24	0.73	94	41
G	4	13				3.24	0.42	100	24
H	4	13				3.24	0.42	100	24
I	11	6				3.65	0.48	100	65
J	2	3	8	4		2.18	0.92	29	35
9a. A	1	8	4	4		2.35	0.90	53	29
B	1	5	10	1		2.35	0.68	35	12
C	10	5	2			3.47	0.70	88	59
D	7	4	4	2 ·		2.94	1.06	65	53
E	9	5	3			3.35	0.76	82	53
F	9	7			1	3.56	0.50	94	53
G	6	8	3			3.18	0.71	82	35
H	11	4	2			3.53	0.70	88	65
I	12	4	1 ·			3.65	0.59	94	71
9b. A	8	7	1		1	3.44	0.61	88	47
B	9	5	3			3.35	0.76	82	53
C	4	6	5	1	1	2.81	0.88	59	29
D	9	7			1	3.56	0.50	94	53
E	9	5	3			3.35	0.76	82	53
F	9	7			1	3.56	0.50	94	53
10a. A	6	10	1			3.29	0.57	94	35
B	2	12	2	1		2.88	0.68	82	18
C		9	6	2		2.41	0.69	53	12
D		14	2	1		2.76	0.55	82	6
E		6	10		1	2.38	0.48	35	0
F	6	10	1			3.29	0.57	94	35
G	2	8	4	1	2	2.73	0.77	59	18
H	3	6	7	1		2.65	0.84	53	24
I	5	9	2	1		3.06	0.80	82	35
J	11	5	1			3.59	0.60	94	65
K	7	4	4	1	1	3.06	0.97	65	47
L	5	7	5			3.00	0.77	71	29
M	7	5	4		1	3.19	0.81	71	41

Question	Strongly Agree (4)	Agree (3)	Disagree (2)	Strongly Disagree (1)	No Resp.	Average	Std Dev	Percent "Agree"	Percent "Strong"
10b. A	3	7	4	1	2	2.80	0.83	59	24
B	3	9	4		1	2.94	0.66	71	18
C	5	8	4			3.06	0.73	76	29
D	8	6	3			3.29	0.75	82	47
E	13	4				3.76	0.42	100	76
F	11	6				3.65	0.48	100	65
G	10	6	1			3.53	0.61	94	59
11. A	10	6	1			3.53	0.61	94	59
B	4	4	7	2		2.59	0.97	47	35
C	7	4	5	1		3.00	0.97	65	47
D	10	7				3.59	0.49	100	59
E	5	8	3	1		3.00	0.84	76	35
F	3	10	3		1	3.00	0.61	76	18
G	6	7	3		1	3.19	0.73	76	35
H	1	2	9	4	1	2.00	0.79	18	29
I	3	7	5	1	1	2.75	0.83	59	24
J	6	8	2		1	3.25	0.66	82	35
K	5	5	5	2		2.76	1.00	59	41
L	10	5		1	1	3.50	0.79	88	65
M	9	4	3		1	3.38	0.78	76	53
N	8	9				3.47	0.50	100	47
O	7	8		1	1	3.31	0.77	88	47

Equations

$$\mu = \frac{\sum_{i=1}^{n} x_i}{n} \tag{1}$$

$$\sigma = \sqrt{\frac{n \sum_{i=1}^{n} x_i^2 + \left(\sum_{i=1}^{n} x_i \right)^2}{n^2}} \tag{2}$$

$$\%_{Agree} = \frac{n_{StngAgree} + n_{Agree}}{17} \times 100 \tag{3}$$

$$\%_{Strong} = \frac{n_{StngAgree} + n_{StngDisagree}}{17} \times 100 \tag{4}$$

Where, n=number of responses, and x=value assigned to each response (strongly agree=4, agree=3, disagree=2, strongly disagree=1).

References

Adkinson, M. 1994. Chief of Aircraft Maintenance Officer Assignments, AFMPC, Randolph AFB, TX. Personal Communications, 8 August.

Air Force Magazine. 1994. Reports from the major commands: Air Education and Training Command. 77(5): 62-64.

Albrecht, K. 1990. *Service within: Solving the middle management leadership crisis.* Homewood, IL: Dow Jones-Irwin.

AMMOC. 1992. *Aircraft maintenance and munitions officer course (AMMOC): September 1992.* Unpublished notes taken during a 1992 AMMOC Quality Improvement Workshop, Chanute Air Force Base, IL.

Armstrong, J.S. 1985. *Long-range forecasting: From crystal ball to computer.* New York: John Wiley & Sons, Inc.

Bair, T.D., & Gatewood, C.F. 1982. *A critical survey of aircraft maintenance officer training and career development.* Unpublished masters thesis, Air Force Institute of Technology, Wright-Patterson Air Force Base, OH. (AD-A122998)

Broardt, G. 1994. Former AMMOC instructor and 1994 Utilization and Training Workshop participant. 82nd Training Group, Sheppard AFB, TX. Personal communications, 10 August.

Bryman, A. 1989. *Research methods and organizational studies.* London: Unwin Hyman.

Boles, B. 1994. *Year of training: Update.* Briefing to Air Force major command vice commanders, HQ USAF/DP, Washington, DC, 9 March.

Chandler, L.S., & Fox, J.B. 1988. *Consolidation of the munitions and aircraft maintenance officer career fields.* Unpublished report, Air Command and Staff College, Maxwell Air Force Base, AL. (AD-A194499)

Dalton, J. 1994. AMMOC Course Supervisor, 82nd Training Group, Sheppard Air Force Base, TX. Personal communications, 1 July.

Department of the Air Force. 1987. *Technical training course manpower standards.* ATC Regulation 25-2. Randolph Air Force Base, TX: HQ ATC.

Department of the Air Force. 1991a. *Evaluation of course C30BR4001 001/002, aircraft maintenance/munitions officer*. TER C91-09. Chanute Air Force Base, IL: HQ 3330th Technical Training Wing.

Department of the Air Force. 1991b. *Officer classification*. AFR 36-1. Washington: HQ USAF.

Department of the Air Force. 1991c. *Officer professional development*. AFR 36-23. Washington: HQ USAF.

Department of the Air Force. 1991d. *White paper: Air Force restructure*. Washington: HQ USAF. September.

Department of the Air Force. 1993a. *Course Chart: Aircraft maintenance and munitions officer*. Course Chart J3OBR4021 004. Sheppard Air Force Base, TX: 360th Training Support Squadron.

Department of the Air Force. 1993b. *Course Training Standard: Aircraft maintenance/munitions officer (4021)*. CTS J3OBR4021 004. Sheppard Air Force Base, TX: 362nd Technical Training Squadron.

Department of the Air Force. 1993c. *Information for designers of instructional systems*. AF Handbook 36-2235, Vol. 1. Washington: HQ USAF

Department of the Air Force. 1993d. *ISD executive summary for commanders and managers*. AF Manual 36-2234. Washington: HQ USAF.

Department of the Air Force. 1993e. *Plan of Instruction: Aircraft maintenance/munitions officer (4021)*. CTS J3OBR4021 004. Sheppard Air Force Base, TX: 362nd Technical Training Squadron.

Department of the Air Force. 1993f. *The quality approach...your guide to quality in today's Air Force*. Maxwell Air Force Base, AL: Air Force Quality Center.

Department of the Air Force. 1993g. *Style guide for theses and dissertations*. Unpublished guide, Air Force Institute of Technology, Wright-Patterson Air Force Base, OH.

Department of the Air Force. 1993h. *USAF formal schools*. AFCAT 36-2223. Washington: HQ USAF.

Department of the Air Force. 1994a. *Air Force career field managers and majcom functional managers manual*. Draft AF Manual 36-2245. Washington: HQ USAF

Department of the Air Force. 1994b. *Organizational charts: 82nd Training Group.* Unpublished organizational chart, 82nd Training Group, Sheppard Air Force Base, TX.

Department of the Air Force. 1994c. *Technical training development.* AETC Regulation 52-1, draft #3 dated 6 Apr. Randolph Air Force Base, TX: HQ AETC.

Department of the Air Force. 1994d. *U&TW list of attendees*, 82nd Training Group, Sheppard Air Force Base, TX.

Department of the Air Force. 1994e. *Training quality assessment.* AETC Instruction 36-2201. Randolph Air Force Base, TX: HQ AETC.

Department of Defense. 1987. *Military training.* DOD Directive 1322.18. Washington: GPO.

Dillman, D.A. 1978. *Mail and telephone surveys: The total design method.* New York: John Wiley & Sons, Inc.

Emory, C.W., & Cooper, D.R. 1991. *Business research methods.* Boston, MA: Richard D. Irwin, Inc.

Frisbee, G.J. 1988. *A study of the technical versus administrative orientation of entry-level aircraft maintenance officer jobs in the Strategic Air Command.* Unpublished masters thesis, Air Force Institute of Technology, Wright-Patterson Air Force Base, OH. (AD-A202627)

Graham, V.M. 1993. Top trainer: An interview with Gen. Henry Viccellio Jr. Commander, Air Education and Training Command. *Airman*, 37(3): 38-41.

Haynes, J. 1994. Training Development Specialist, 362nd Training Squadron, 82nd Training Group, Sheppard Air Force Base, TX. Personal communications, 1 July.

Hayes, R.T. 1992. Systems concepts for training systems development. *IEEE Transactions on Systems, Man, and Cybernetics*, 22 (2): 258-266.

Keane, K.A. 1992. This is quality. *Airman*, 36(Aug): 4-13.

Kettell, K.D., & Ziegler, F.T., II. 1992. *Corporate information management and business process improvement under the unit cost program: An analysis of a system for the Air Force Institute of Technology.* Unpublished masters thesis, Air Force Institute of Technology, Wright-Patterson Air Force Base, OH. (AD-A258984)

Klassen, R.D., & Whybark, D.C. 1994. Barriers to the management of international operations. *Journal of Operations Management,* 11 (4): 385-396.

Lawlor, M. 1994. Training Manager, 362nd Training Squadron, 82nd Training Group, Sheppard Air Force Base, TX. Personal communications, 4 August.

Linstone, H.A., & Turoff, M. 1975. *The Delphi method: Techniques and applications.* Reading, MA: Addison-Wesley Publishing Company, Inc.

Majchrzak, A. 1984. *Methods for policy research.* Beverly Hills, CA: SAGE Publications, Inc.

McLaughlin, L. 1994. Programmer, Second Air Force, 2AF/DOPR, Keesler AFB, MS. Telephone conversation, 10 Aug.

Osborne, D., & Gaebler, T. 1992. *Reinventing government: How the entrepreneurial spirit is transforming the public sector.* New York: Addison-Wesley Publishing Co., Inc.

Perini, M.B. 1992. The chief of staff explains the next step as he looks: Beyond restructuring. *Airman,* 36(Jan): 38-41.

Shoffner L. 1994. Chief, Training Plans, 362nd Training Squadron, 82nd Training Group, Sheppard Air Force Base, TX. Personal communications, 1 July.

Speights W. 1994. Chief, Training Quality Assessment, 82nd Training Group, Sheppard Air Force Base, TX. Personal communications, 30 June.

Thomas, B. 1992. *Total quality training: The quality culture and quality trainer.* New York: McGraw-Hill Book Company.

Trip, J.A. 1994. Chief, Aerospace Leadership Division, Squadron Officers School, Maxwell AFB, AL. Telephone conversation. 10 August.

Viccellio, H., Jr. 1993. *Career ladder and training of logistics officers.* Letter to the Deputy Chief of Staff for Logistics, Headquarters, United States Air Force. Randolph AFB, TX, 1 September.

Wilcox, T. 1994. Occupational Analyst, Air Force Occupational Measurement Squadron, Randolph AFB, TX. Personal communications. 9 August.

Acred Vita

Captain Jeffrey T. Acred is from Memphis, Tennessee. He graduated from the University of Mississippi in 1985 with Bachelor of Science degree in Electrical Engineering. After receiving his commission into the United States Air Force through the Reserve Officers Training Corps, and completing the Aircraft Maintenance Officers Course (AMOC), Captain Acred was assigned to the 96 Bombardment Wing (BMW) at Dyess AFB, Texas.

During his tour at Dyess AFB, Captain Acred filled a variety of maintenance positions in support of the B-1B and KC-135A aircraft. These positions included assistant maintenance supervisor of the 96 Avionics Maintenance Squadron, B-1B Site Activation Task Force (SATAF) maintenance officer, 96 BMW maintenance control officer, and Officer in Charge (OIC) of Tanker Branch. As Tanker Branch OIC, Captain Acred deployed to Incirlik Air Base, Turkey, in support of Operation Desert Shield/Desert Storm.

In 1992, he was assigned to Chanute AFB, Illinois, where he served nearly two years as an instructor for the Aircraft Maintenance and Munitions Officers Course (AMMOC). With the drawdown of Chanute AFB, Captain Acred entered the Air Force Institute of Technology at Wright-Patterson AFB, Ohio, and graduated in 1994 with a Masters degree in Logistics Management. He was subsequently assigned to the Depot Maintenance Directorate, Headquarters Air Force Materiel Command.

> Permanent Address: 4417 Charleswood
> Memphis, TN 38117

Witter Vita

Captain James "Randy" Witter was commissioned in the Air Force in 1985 through the ROTC program at Purdue University, West Lafayette, Indiana, where he graduated with a Bachelor of Science degree in Mechanical Engineering. His first assignment was to Chanute AFB, Illinois, for six months as a student in the Aircraft Maintenance Officers Course (AMOC).

Upon completion of AMOC in June 1986, he was assigned to Dyess AFB, Texas, where he served as a maintenance officer in various capacities to include Assistant Maintenance Supervisor for both the 96th Field Maintenance and Organizational Maintenance Squadrons, Officer in Charge (OIC) Bomber 3 Flight, Tanker Branch OIC, and Maintenance Control Division Chief supporting the B-1B and KC-135A aircraft.

In September of 1988, Capt Witter took an assignment to the 50th Tactical Fighter Wing at Hahn Air Base, Germany, as the 10th Aircraft Maintenance Unit (AMU) Assistant OIC and then as the 496th AMU OIC supporting the F-16C/D aircraft.

After drawing down his unit for base closure in 1991, he moved to Wright-Patterson AFB, Ohio, as the Air Training Command Training Support Manager for the F-16 System Program Office and several other smaller program offices. He was responsible for overseeing the acquisition of both training and training equipment.

He was accepted into the Air Force Institute of Technology at Wright-Patterson AFB in May 1993 and graduated with a Masters degree in Logistics Management in September 1994. His follow-on assignment was to the Logistics Directorate, Headquarters US Air Forces Europe.

Permanent Address: 11982 E. Maple Av.
Aurora, CO 80012

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE September 1994	3. REPORT TYPE AND DATES COVERED Master's Thesis

4. TITLE AND SUBTITLE
QUALITY IMPROVEMENT ANALYSIS OF THE AIR FORCE
AIRCRAFT MAINTENANCE AND MUNITIONS OFFICERS COURSE

5. FUNDING NUMBERS

6. AUTHOR(S)

Jeffrey T. Acred, Captain, USAF
James R. Witter, Captain, USAF

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

Air Force Institute of Technology,
WPAFB OH 45433-6583

8. PERFORMING ORGANIZATION REPORT NUMBER

AFIT/GLM/LAR/94S-1

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)

HQ USAF/LGMM
Washington DC 20330

10. SPONSORING / MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION / AVAILABILITY STATEMENT

Approved for public release; distribution unlimited

12b. DISTRIBUTION CODE

13. ABSTRACT (Maximum 200 words)

Previous research concerning aircraft maintenance officer training focused on the content of the training curriculum of the Aircraft Maintenance and Munitions Officers Course (AMMOC). Conversely, this study sought improvement in aircraft maintenance officer training by evaluating the guidance and support provided to AMMOC. Two methods were employed for identifying such opportunities. First, a descriptive model of the training system supporting AMMOC was developed and analyzed. Second, feedback was solicited from AMMOC instructors through the use of a two-round Delphi. The Delphi was employed to develop a consensus among the instructors regarding what improvement opportunities existed and potential means for taking advantage of these opportunities. Findings indicate that AMMOC may be improved by: facilitating better communication between AMMOC, its customers, and other organizations; empowering AMMOC instructors with more control over the course training standard (CTS), student scheduling, and customer feedback; and providing instructors more time for course development by assessing and satisfying AMMOC's manpower requirements and refining training development and manning policies.

14. SUBJECT TERMS
Aircraft Maintenance, Air Force Training, Decentralization, Delphi Techniques, Instructional Materials, Instructors, Job Training, Leadership Training, Maintenance Management, Maintenance Personnel, Management Training, Training Management, Quality.

15. NUMBER OF PAGES
180

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	UL